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THE
MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—9TH YEAR. SYDNEY: SATURDAY, APRIL 22, 1922. No. 16.

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A THEORY OF CANCER.[1]

BY THOMAS CHERRY, M.D., M.S. (MELB.),
Melbourne.

IT is well established that some phases at least in the life history of the skin, the breast and the uterus are under the control of certain internal secretions, which act as a stimulus to the nutrition, development and regeneration of the cells of these organs. It is also a fact that these organs, together with the digestive system, are the special sites of malignant disease. If cancer can be shown to be definitely increasing at the present time, it appears possible that modern conditions of life may be interfering with the equilibrium which formerly existed between the life of the cells of these organs and the supply of the regulating secretion.

I am, of course, quite conscious of the apparent hopelessness of the task of attempting a new theory as to the causation of tumours, but the nature of the cancer problem justifies every effort that can be made towards unravelling its mysteries. In Australia it now causes the death of one person out of every eight who die at the age of forty and upwards. The numbers have been increasing with invariable regularity each year and the mortality caused by the disease would be considerably higher, were it not that a large number of cancers are now cured by early removal. Formidable as is the problem in Australia, it is much worse in many European countries, where the deaths per unit of the population are as four to three. Nor can we any longer regard cancer as a special disease of advanced life. In Victoria in 1920 it caused 13% of all the deaths that occurred between the ages of 35 and 55 and less than 12% of those which occurred in people over the age of 55.

The Reality of the Increase.

The cancer problem will appear in a totally different light if it can be shown that the apparent increase of the disease is a reality. Twenty years ago it was widely claimed that the increase in the crude death-rates did not indicate any real increase whatever. It was explained as being due to more accurate methods of diagnosis, the steady increase in the average age of the population and by the disappearance of the item "Ill-defined and Unspecified Causes" from the bills of mortality.

The following evidence will, I think, be sufficient to convince the most sceptical as to the reality of the increase:

Cancers in Early Life.

(*i.*) In Victoria the deaths from cancer under the age of 45 show no increase for four census periods

[1] Read at a meeting of the Victorian Branch of the British Medical Association on March 1, 1922.

when the age distribution of the population is accurately known. In the following table they have been calculated on the basis of 10,000 of each sex living in each age-group. The next age-group, 45 to 55 years, is appended to show the increase.

Deaths From Cancer in Victoria Per 10,000 of Each Sex.[1]

Age-Group.	1880-1882.	1890-1892.	1900-1902.	1910-1912.
Under 5 ..	0.41	0.27	0.56	0.92
5 to 10	0.36	0.20	0.46	0.35
10 to 15.. ..	0.24	0.17	0.20	0.43
15 to 20.. ..	0.33	0.29	0.50	0.59
20 to 25.. ..	0.64	0.54	0.56	1.12
25 to 35.. ..	3.45	2.49	2.87	2.35
35 to 45.. ..	11.44	11.72	9.74	10.42
Total ..	16.87	15.68	14.89	16.18
45 to 55.. ..	25.23	32.83	32.27	33.90
Per Million ..	1261	1641	1613	1695

The figures for the last census are not yet available, but the records for 1919 and 1920 seem to indicate that the deaths below 45 are keeping steady. Cancer in early life often affects the bones, brain and kidneys, so that errors in diagnosis would be excusable in the old days when every internal tumour was queried as a hydatid cyst.

In the Commonwealth in 1909 cancer caused 267 deaths out of a total of 19,604 which occurred under the age of 40. In 1920 the corresponding figures were 299 and 23,378. Thus at these ages in 1909 cancer caused one death in 73.4 and in 1920 one death in 77.9. But in 1909 cancer caused 14.2% of all deaths in the age-group 45-55, as compared with 15.7% in 1920. These figures correspond to the rise from 1,613 to 1,695 per million of this age in Victoria, as shown by the above table.

(*ii.*) In Prussia for the eleven years, 1903-1913, with an average population of nineteen millions, the rate under 30 remained stationary at 160 per million in these age-groups; the rate for the age-groups 30 to 60 increased 10% and that for the age-groups 60 and over increased 33% in the same period. In the last group the rate rose uniformly in every successive year. Similar figures are available for Bavaria.

(*iii.*) In England the rates for all the age-groups under 45 remained absolutely stationary during the two decennial periods, 1891-1900 and 1901-1910. But for every other age-group there was a marked increase, *viz.*, for 45 to 55, 7%; 55 to 65, 13%; 65 to 75, 19%; and for 75 and over, 28%. The standardized rates for males show a further rise of 20% between 1901-1910 and 1919.

(*iv.*) A special investigation by the Registrar-General of the deaths in England for the ten years 1900-1909, the population being standardized on the basis of the census figures for 1901, showed that the deaths from cancer affecting certain sites increased as follows per million of the population:

[1] Compiled from Victorian Year Book, 1920-1921, page 169.

Deaths From Cancer Affecting Certain Sites in England and Wales.

Site.	Males.	Females.
Stomach	From 138 to 182	From 122 to 152
Intestines.. ..	From 45 to 75	From 60 to 100
Rectum	From 60 to 88	From 48 to 62
Tongue	From 38 to 48	—
Breast..	—	From 150 to 188

These facts establish the reality of the increase without going back to earlier years. During the present century there may have been slight improvements in diagnosis and registration, but these cannot account for the steady and continuous progress of the disease. Moreover, cancer has been a live problem since the 'nineties and medical men have been on the alert. The fact that no increase whatever has occurred in any of these figures for ages earlier than 45 makes it practically certain that the increase disclosed after that age is real. The Australian and English figures reinforce each other.

Nor is this all. For if we have established the reality of the increase in these specific instances, we may with due precautions use the vast body of statistics collected by Hoffman.[(1)] These records are of varying degrees of reliability and therefore they yield only approximate results, but the general drift of the evidence from all parts of the world is in the same direction. Dr. Hoffman is statistician to the Prudential Life Insurance Company and Chairman of the Statistical Committee of the American Society for the Control of Cancer. He writes (page 218): "The conclusion is advanced and without hesitation that the evidence of cancer increase throughout the world is an incontrovertible statistical fact and absolutely conclusive."

The value of the evidence is modified, but not nullified, by doubts as to its absolute accuracy. Thus the apparent increase may be 18% and by various considerations it may be reduced to 12%. The all-important point is not the 18 or 12, but the fact that there has been an increase within a definite period. I am using crude figures unless otherwise stated, recognizing that a variable proportion has to be deducted to reach the true values and that the chief source of error is found in countries that are receiving large numbers of immigrants, so that the age-groups are abnormal. This difficulty may often be met by expressing the cancer deaths in the form of percentages of the total deaths in any given age-group.

The Problem to be Solved.

If we accept the reality of the increase, the fundamental question is set in a new light. We have to account for not only what may be called the normal incidence of cancer as seen in the non-progressive death-rate under the age of 45, but also for the abnormal increase which now affects the next and following age-groups in most parts of the world. The main practical difference between epithelial and sarcomatous growths is that the one class is increasing from year to year and the other not. So also simple tumours do not (except possibly in the

case of uterine myomata) seem to be increasing in frequency and yet it is very probable that innocent and malignant tumours are closely related as to their origin. But in regard to epithelial cancers, we have to account not only for what Jonathan Hutchinson called the rebellion of the cells, but also for the wholesale increase in the rebellion which many of us have witnessed during our own lifetime. In one sense cancer may be called a new disease, simply because it has become so common.

It is known from clinical and experimental evidence that special irritations, such as radiant energy and tar oils, are able to set up cancerous proliferation of the epithelial cells. Such observations are of extreme value in helping us to attack the problem, but of themselves they operate in only an insignificant minority of cancers and do not in any way clear up the modern position. So also in regard to the older theories of Cohnheim and Ribbert and the more recent ones of Adami and Payne, which postulate some definite change in the character of the epithelial cells or of the surrounding tissues. These theories appear to me to lose sight of the fact that the mechanism which regulates the growth and functions of the body, has been gradually evolved from the pre-human stage of our ancestry and such old-established mechanism is not likely to break down suddenly. From our knowledge of comparative pathology we can, so to speak, excuse the appearance of a sarcoma occasionally in early life, but we cannot account for the cancer problem steadily increasing in dimensions during each year of the present century. The conditions which result from failure of the thyreoid, adrenals or pituitary do not seem to be increasing in frequency. It is surely significant that the crude action of the internal secretions of these glands is very similar in all classes of vertebrates. Man therefore forms no exception to this rule and if the increase of cancer is a fact, we may regard it as highly improbable that this increase is due to a modern alteration in the character of an archaic secretion.

Many attempts have been made in recent years to account for the modernization of the disease by referring it to the increased consumption of single articles of diet, such as meat, sugar, tea or coffee, or to speak of some indefinite influence of the growth of cities and the general rise in the standard of ease and comfort. But such theories make no allowance for the great elasticity in the way of food and environment which is a characteristic of many of the higher animals and I think it is a sound principle that, before admitting any supposed factor, we should be able to see how it is likely to have affected the issue. Otherwise we are falling into the errors of our grandfathers, who proved to their own satisfaction that cholera was due to atmospheric conditions, because the incidence of the disease in London corresponded very accurately with the height of the houses above the level of the Thames.

The Concomitants of Cancer.

In order to see if modern conditions of life are interfering with the equilibrium of Nature as exhibited in the human organism, it is necessary to examine the conditions under which the disease occurs. It has long been known that cancer is much more common in some parts of the world than others, that it selects certain occupations in preference to others and until recent years it was more common in women than in men. Many writers have attempted to find the explanation of the disease in one or more of these circumstances. Before deciding whether any of them can be looked upon even as predisposing causes, it is necessary to ascertain the facts and then to see if some unifying principle can be found running through them. If one can be found, it is possible that we are on the track of the causation of the disease.

A.—The Effect of Cold.

At first sight it would appear that cold has a definite influence on the incidence of the disease. Cancer affects the colder temperate regions rather than tropical and sub-tropical climates; it becomes more common with distance from the equator and with height above sea-level. Hammerfest, the most northerly town in the world, although it contains only 3,300 inhabitants, has one of the highest cancer rates—1,350 per million. If the cities with a population of over 300,000 are arranged according to the cancer rates, it will be found that cold cities invariably have high rates and hot cities, with the two exceptions of Havana and New Orleans, invariably have low rates. If we include in this survey all the towns with a population of 100,000 and over for which data are available and group them according to zones of ten and twenty degrees in latitude, the results are very striking:

Cancer Mortality Per Million for Cities.[1]

Latitude.	Number of Cities.	Total Population.	Cancer Rate, 1908-1912.
60° N. to 50° N. ..	35	24,000,000	1,057
50° N. to 40° N. ..	48	27,500,000	924
40° N. to 30° N. ..	24	10,000,000	781
30° N. to 10° N. ..	7	2,750,000	423
10° N. to 10° S. ..	4	550,000	409
10° S. to 30° S. ..	7	1,800,000	377
30° S. to 40° S. ..	6	3,400,000	890

Amongst European countries the latest returns are in the following order: Switzerland, 1,240; Scotland, 1,160; Holland, 1,090; Sweden, 1,060; Norway and England, 960; the incidence falling to 640 in Italy and 600 in Spain.

In the United States of America under the same conditions of registration the rates were in 1908-1912: Vermont, 1,110; Maine, 1,070; Massachusetts, 1,010; New York, 870; Connecticut, 850; Pennsylvania, 720.

The high incidence of cancer in cold countries under conditions which otherwise seem to favour a very low rate is seen in Japan, North China, Tibet, the Caucasus, Abyssinia and Equador in South America. Yet it is clear that a cold climate is not essential to a high death-rate, for this has risen to

[1] Tabulated from Hoffman, pages 403-406 (with the addition of figures for Melbourne).

864 per million in the island of St. Thomas in the West Indies. This island is self-contained and has a negro population of 10,000. We must also note that the rate is higher in Queensland than in Tasmania. Conversely, the rate is very low in Finland, Iceland, Quebec and amongst the Eskimo.

B.—Cancer Marches With Civilization.

Cancer is rare amongst half-civilized and savage races in all parts of the world; how rare we cannot say, but of the fact there is no doubt. The highest rate is found in countries which are abundantly supplied with food and have attained the highest average standard of wealth and comfort with the utilization of the forces of Nature to reduce manual work. The larger the proportion of the population that is on the verge of need, requiring steady and continuous toil by primitive methods to procure food or other means of subsistence, the lower is the death-rate. If we take civilization in the broad sense to mean amelioration of the conditions of the struggle for existence, the lower is the general death-rate and the cancer-rate is almost in converse order to the general death-rate. The European countries just enumerated stand in the following order in regard to the general death-rate: England, Holland, Scotland, Norway, Sweden, Switzerland,[1] Italy and Spain.

In dealing with different countries, a number of sources of error cannot be eliminated from our data, but we arrive at similar results by comparing towns in the same country or even districts in the same city. The following cases illustrate this point:

London—	
Marylebone	2,100 per million
Stepney	450 per million
England—	
Huntingdon (County)	1,270 per million
Durham (County)	670 per million
Ireland—	
Ulster (Province)	838 per million
Connaught (Province)	488 per million
Germany—	
Cologne	912 per million
Essen	614 per million

I shall now show that civilization may be a predisposing cause of cancer by producing a general condition of over-nutrition and by reducing the amount of muscular work.

(i.) The Influence of Over-Nutrition.

This is so apparent on the most superficial view of figures similar to those just given that the character and amount of the food is often considered a chief element in the causation of the disease. Roger Williams puts it tersely: "High feeding and easy living" and Bulkley remarks that during the past fifty years the amount of meat eaten in England has more than doubled *per capita* and cancer has increased fourfold.

Experimentally there is clear evidence as to the predisposing influence of over-nutrition. In mice and rats the percentage of successful cancer grafts is much greater in well fed as compared with wasted and debilitated animals.[2] Again, in a thyreoid carcinoma in trout and other fish in artificial hatcheries, Gaylord[3] found the epidemic was not infectious but due to over-feeding with an incomplete food. The fish recovered if left in the same pond, provided the food supply was put right. So also the two domestic animals which are most subject to cancer, the dog and the horse, are on the average probably more highly fed than is the case with their wild relations.

It is quite unnecessary to produce facts to prove that the matter of the food supply is on a very different footing now from what it was thirty years ago. The change includes all accessory foods as well as pure dietetic luxuries, which now are easily procurable by those who desire them. As far as food goes, we may safely assert that all classes are now able to secure ample nutriment and that hunger in the old sense of the term is rare. The connexion between good food and cancer is seen in the highest occupational cancer rates in England in 1900-1902. This class comprises brewers, farmers, graziers, private coachmen, private grooms and civil servants. In 1904 in Hungary, where the social difference between master and employee was much more marked than in England, the deaths of the employers in a number of occupations were several times as high as they were for the workmen:

Cancer Mortality in Hungary, 1904: Rates Per Million.

	Employers.	Workmen.
Commerce	1,190	510
Carpenters and Cabinet Makers	1,115	470
Tailors	1,145	324
Blacksmiths	1,085	249

Confirmatory evidence is found in the results of a medico-actuarial investigation into the relationship of "build" at the time of insurance and cancer, which included thirty-four American companies.[1] After the age of 45 cancer was 30% more common in the "over-weights" than in the "under-weights." Conversely Russell has pointed out the remarkable immunity to cancer which obtains amongst the old men who are members of religious brotherhoods in England and France. Clinical observers have noted that cancer very often attacks individuals who are young for their years—"large, robust, well-nourished, florid persons, overflowing with health and vitality," that cancer and tuberculosis are almost mutually exclusive and I think that many European countries which now have a high rate, have experienced a sudden change from frugal to very easy circumstances, a change which has affected the great mass of the population. Under such circumstances the consumption of highly nutritious foods is greatly increased. This factor is probably the most important link in the chain which connects civilization and cancer.

(ii.) Civilization Reduces Muscular Work.

Next to the changes in the quantity of food, the great change brought about by civilization is the lessened amount of muscular work done by all

[1] The high death-rate in Switzerland is a post-war phenomenon. In 1912-1913 it ranked next to England and Holland.

classes of the community. This is the result partly of shorter working hours and partly of the invention of labour-saving implements and machinery. Wherever there is any very laborious work to be done, it is certain that machinery will be installed to do it. For instance, steam navvies, stone crushers and rock drills were comparatively early applications of machinery. Steam hammers, shapers and electric cranes have done away with much hard work in the foundry and iron trades. Saw milling, woodworking and brickmaking used to involve continuous heavy exertions; now the engine does the work and the man guides the machine. In the old days the ploughman worked nearly as hard as his horses; now he sits on his implement and merely guides the team. In the city no one ever dreams of walking even a mile. The incidence of cancer keeps pace with the installation of machinery. I shall now show:

(*a*) The cancer rate is highest in the countries and cities where manual labour and factory work is "light" rather than "heavy."

(*b*) In the occupational analysis of cancer rates we find the most laborious trades have the lowest rates, unless an abnormal rate can be otherwise explained.

(*c*) In most parts of the world the female rate is much higher than the male rate, but the two approximate as the conditions of muscular work approximate in the two sexes.

(a) Cancer and Hard Work.

The relative rates in different countries can hardly be compared, because the climatic influence and many other factors differ. But by taking two cities of about the same size in the same country we are able to estimate approximately the effect of muscular work, the busy manufacturing centre being always the lower and to a most marked degree if it specializes in heavy iron and steel work or in coal mining.

The following pairs of towns usually lying within fifty miles of each other illustrate this point:

Influence of Heavy and Light Work.

	England.		
Sheffield	838	Leeds	1,039
	Scotland.		
Glasgow	1,069	Edinburgh	1,197
	Ireland.		
Belfast	841	Dublin	1,121
	Germany.		
Essen	614	Cologne	912
Leipzig	989	Dresden	1,318
	Italy.		
Turin	1,120	Florence	1,617
	United States of America.		
Pittsburg	664	Philadelphia	853
Buffalo, New York	887	Boston	1,057
Cleveland	699	Hartford	995

In this list the most prominent difference between each pair is the fact that the one with the low cancer rate is also the one with the greatest amount of hard muscular work. The citizens of the second column may be just as hard working as those of the first, but their work does not call forth the same type of muscular energy. This list, dealing with cities only a few miles apart, is probably affected to an equal extent by all the factors which raise doubts as to the reliability of the statistical methods. The uniform direction of the evidence is all in favour of its reliability. In nearly all the cases the population dealt with is over 300,000.

(b) Cancer as an Occupational Disease.

The tables supplied by the Registrar-General for the years 1900-1902 include all deaths of males over the age of 15. I have arranged the list in order of the cancer death-rate calculated as percentages of the total deaths in each occupation. The percentage of deaths due to phthisis is given in parentheses for certain of the trades.

Percentage of the Total Deaths in Each Occupation.

Occupation.	Total Deaths.	Per-centage Due to Cancer.
Hotel servants (30)	2,109	Over 3
Coal and other miners, coal heavers (15)	46,151	Over 4
Law clerks (24), wharf labourers (18), tanners,[1] tool makers, file makers (19), anchor and chain makers, draymen and carriers (16), innkeepers, wine merchants, cotton spinners (15), general labourers, metal workers	145,336	Over 5
Engineers and boilermakers (16), textile trades, domestic servants (18), clerks (24), drapers (19), seamen, shopkeepers, medical men, coachmen, grooms, wool manufacturers, farm labourers, shoemakers (16), leather workers, railwaymen, bakers, teachers, grocers, blacksmiths, road labourers, building trades	189,841	Over 6
Watch and clock makers, jewellers (18), "other males,"[2] locomotive engine drivers and stokers, commercial travellers, fishermen, barristers, solicitors, clergy, brewers	69,791	Over 7
Furriers,[1] farmers, graziers, private coachmen and grooms (15), civil servants	24,803	Over 8

This is the most complete list of cancer mortality by occupation which has hitherto been published and deserves the closest study. In some cases, as hotel servants, law clerks, file-makers, etc., the death-rate from pulmonary tuberculosis is abnormal and, as was long ago pointed out by Paget and Watson, the natural tendency seems to be for cancer and tuberculosis to attack the opposite types of constitution. This list certainly shows the mortality from the two diseases to be in inverse order. Forty years ago such a list would have been complicated by the question of the adequacy of food supply in some instances, but, as we have already pointed out, this disturbing factor no longer exists. Making due allowance, therefore, for tuberculosis and over-nutrition, the order of the cancer rate falls in line with what has been said about muscular work, but

[1] Total deaths under 1,000.
[2] Other males numbered 55,208.

modified by climatic factors, that is, by protection from the cold and rain. Thus, miners have the lowest rate; seamen and fishermen, who work perhaps equally hard but are exposed to all weathers, have very much higher rates. Work near a fire also reduces the rate, as is seen in tool-makers, chainmakers and metal-workers. The only exception to this rule is that blacksmiths are rather far removed from the engineers and boilermakers. Building trades, farm labourers, road labourers and locomotive drivers are all exposed to the wind; the lighter trades—bakers, grocers and jewellers—are all high, the rates being equal to those of the professions which involve little muscular work. Private coachmen and grooms have light work and are very well fed and it would appear that the civil servant also has an easy time. A high cancer rate in conjunction with a high phthisis rate is found only in private coachmen and grooms and watchmakers and jewellers. The cancer rate was higher than the phthisis rate in the following occupations: Fishermen, farm labourers, farmers and graziers. clergy, barristers, solicitors and medical men.

In reference to the significance of protection from or exposure to the wind and rain, I shall assume that the crucial point is the excretion of sweat. Hence a very cold climate or exposure to wet and cold neutralizes the influence of hard muscular work. In this case the muscular work maintains the body temperature, but cannot raise it above normal. In the case of hard work in mines, near furnaces or in localities with a high atmospheric temperature, the muscular exercise would raise the body temperature if it were not regulated by the free action of the sweat glands. This, possibly, is the fact which controls the incidence of cancer, both in regard to latitude, climate and occupation under conditions of over-nutrition.

These results of the analysis of English data are strikingly confirmed by the more limited data available from American and Australian sources. The position of the miners at the lowest rate, followed by occupations in which one suspects a high tuberculous death rate, is the same, while the highest rates include the building trades, gardeners and fishermen, as well as professional men.

Expressed as percentages of the total deaths in each occupation, the following comparison is significant:

Comparison of the Percentages of the Total Deaths in Each Occupation.

American Life Insurance Results.	Australia, 1920.	
3% and over: Coal miners, printers, barmen	Miners	5.6%
4% and over: Clerks, draymen	Domestic class	8.7%
5% and over: Ironworkers, labourers, butchers, railwaymen, shoemakers	Transport workers	9.0%
6% and over: Textile trades, masons, carpenters	Building trades	10.5%
7% and over: Farmers, graziers, blacksmiths	Farmers, graziers	10.0%
8% and over: Gardeners, fishermen, professional men	Independent means	12.5%
	Professional	8.3%

(c) The Rates for Men and Women.

With the steady advance of the disease in recent years it is found that in all countries the male and female rates are approximating to the same figure and that in Australia, Switzerland, Norway, the rural parts of Sweden and Japan the rate is now higher in men. It may be questioned therefore if there is any special proclivity in women, although the disease often attacks the female organs. In the meantime the possibility is noted that the higher rate may be related to the fact that on the average women do less muscular work than men. So also I shall for the present assume that race has no important share in producing the disease.

Analysis of the Increase.

(*i.*) The increase has affected widely different parts of the world with singular uniformity. For instance, Sheffield and South Australia are two communities chiefly English by descent in which the population and the cancer rate have kept pace with each other for twenty years. Yet the external conditions are quite the opposite—cold, smoky, indoor manufacturing life in the one case and hot, dry atmosphere, bright sunshine, open-air country life in the other.

Uniformity of Increase.

Period.	Sheffield.		South Australia.	
	Population.	Cancer Rate.	Population.	Cancer Rate.
1891-1893	335,000	490	326,000	486
1911-1913	465,000	838	422,000	781

(*ii.*) In Europe the increase has been much more marked in men than in women. The difference is most marked in the case of manufacturing towns; it is least in countries where the women still do much of the agricultural and field work.

Increase in Cancer Rates (Per Million).

Location.	Period.	Men.	Women.	Difference
England & Wales	1881-1919	260	173	+ 87
London	1881-1913	237	158	+ 79
Sheffield	1887-1913	264	156	+ 98
Manchester	1891-1912	183	140	+ 43
Ireland	1893-1912	180	170	+ 10
Norway	1896-1912	134	125	+ 9
New Zealand	1891-1913	334	327	+ 7
Queensland	1900-1920	226	283	— 57

The anomalous position of Queensland is probably due to the relative change in the numbers in the age-groups of women after 50, as the sudden rise from 560 to 800 in six years is surely abnormal.

(*iii.*) In Australia for the ten years 1909-1920 the percentage of deaths due to cancer in each age-group increased as under in relation to the total deaths in that age-group:

PERCENTAGE OF DEATHS IN AUSTRALIA DUE TO CANCER IN RELATION TO THE TOTAL DEATHS.

Year.	Age-Groups.							
	40-45.	45-50.	50-55.	55-60.	60-65.	65-70.	70-75.	75-80.
1920 ..	9.7	14.4	16.7	17.8	18.0	16.2	12.6	9.5
1909 ..	10.5	12.5	15.3	17.0	16.1	14.3	11.5	8.4
Incr'se	—0.8	1.9	1.4	0.8	1.9	1.9	1.1	1.1
Incr'se % ..	—1	15	9	4.6	12	13	9	13

An increase of over 10% has thus occurred in four age-groups in ten years. This is perhaps all the more significant in view of the fact that the increase was greatest in the age-group 45-50.

Site Incidence.

I shall attempt to separate the essential from the contributing causes by an analysis of data relating to the starting points of the disease. The periods covered are either the years 1906-1910 or 1908-1912. In the first column the number of persons included in the data is given, that is, the average population multiplied by the number of years. The general rate per million comes next. In the next two columns the percentages of the total male deaths which are contributed by the digestive system and skin respectively, are given. The digestive system includes mouth, tongue, liver, pancreas and rectum. Skin includes the margins of all the mucous membranes which adjoin it.

Similar information is given in the three last columns for females, the digestive system being as defined for males and the uterus includes the ovaries, tubes and vagina.

The population of these countries averaged about 173 millions, so that the records are equivalent to one year's mortality among 865 million persons.

ANALYSIS OF CANCER MORTALITY.

Country.	Population Equivalent (Millions).	General Rate.	Males.		Females.		
			Contributed by Digestive System.	Contributed by Skin.	Contributed by Digestive System.	Contributed by Uterus, etc.	Contributed by Breast.
Switzerland	18	1,259	80%	7%	48%	17%	10%
Bavaria ..	40	1,094	84%	4%	54%	17%	7%
Holland ..	29	1,034	83%	6%	67%	13%	9%
Scotland ..	23	997	74%	10%	52%	18%	13%
Norway ..	12	966	78%	12%[1]	68%	12%	8%
England ..	175	940	75%	12%	47%	23%	17%
Ireland ..	22	788	74%	20%	44%	15%	16%
Australia ..	22	732	71%	16%	44%	21%	15%
U.S.A. ..	236	726	70%	21%	40%	23%	14%
Uruguay ..	5	660	71%	11%[1]	54%	20%	6%
Japan ..	100	655	82%	6%	54%	32%	3%
Italy	169	636	60%	24%[1]	50%	23%	8%
Cuba	11	446	60%	27%[1]	34%	41%	10%
Mexico City	2	501	44%	37%	21%	53%	5%

[1] Rate deduced from indirect data.

The figures for the United States of America include only those of the Registration Area States. Japan, Uruguay, Cuba and Mexico City are included because they appear to continue the series often indicated by European figures alone. The precautions attending the use of such statistics have already been noted. The materials for this analysis have been taken from Hoffman.

If the records are of equal value, it is clear that the influence of civilization and of climate on the general rate corresponds with what has already been said on the subject. As far as the male rates are concerned, it will be seen that the percentage of all the deaths contributed by the digestive system falls from 84 in Bavaria to 44 in Mexico City. These wide divergences make it improbable that the essential cause of cancer is located in any part of this system. The skin rate for men has been determined in the following way: From English hospital records it appears that admissions for cancer of the skin are about six times as numerous as the corresponding mortality rate given by the Registrar-General. These cases would ultimately swell the death-rate if not so treated. I have therefore multiplied the death-rate by five to arrive at an assumed natural mortality from the skin; but in the countries so marked the skin rate is not supplied in the official figures, so that I have inferred it from other data, placing it probably lower than it actually was. It will be seen that the digestive system and skin contribute in most cases about 80% of the "natural" cancer mortality in males.

Turning now to the data concerning cancer in females, it will be seen that the sum of the three sites given is usually well above 80% of the total mortality. But the moieties contributed by each site vary in different parts of the world. Thus the two countries with the highest percentage for the digestive system are lowest for the uterus, while these rates are reversed for Cuba and Mexico City. The value of these figures lies in the information of this kind which they supply. For if we suppose that only half the deaths in, say, Cuba are registered, it is not probable that the incidence in these two sites would be reversed in the cases that have escaped registration.

The English-speaking peoples form a group in which the incidence is more nearly alike than in any other series:

PERCENTAGE MORTALITY BY SITE IN WOMEN.

Site.	England.	Ireland.	Scotland.	Australia	United States of America.
Digestive System ..	47	44	52	44	40
Uterus, etc. ..	23	15	18	21	23
Breast	17	16	13	15	14
Total ..	87	75	83	80	77

These figures may indicate the influence of some racial characteristics in customs and manner of

life or they may point to inherited peculiarities in the broader sense of being transmitted down the centuries by descent from a common stock. They are not climatic, for cancer of the breast is as common in Australia as in the British Islands, and this organ is very seldom affected amongst Japanese women, even when they emigrate to Hawaii or the Philippines.

I think these figures are strong evidence against two of the theories of cancer: the infective theory and that of local irritation. It seems hardly probable that an infective disease should attack the female digestive system in 68% of all cases in Norway and only 21% in Mexico City. Indeed, I may go farther, because in Calcutta there was only one case of cancer of the stomach in a thousand autopsies occurring in the regular practice of one of the chief hospitals. So also at Lahore, 400 hospital patients with cancer did not include a single example of the disease affecting the stomach. Again, if cancer is essentially a local disease, it is hard to see why these three great systems of epithelium should be the site in four-fifths of the cases, leaving the remainder of the sites to be located in non-epithelial tissues and, as I shall show, sarcomata sometimes reveal racial peculiarities which are associated with the colour of the skin.

So far as is known, in all cases of irritation cancer the disease begins at the site of irritation. In view of this direct evidence, it is probable that the epithelium of the three systems—digestive, reproductive and the skin—is in some way directly involved in the causation of the disease. But the wide variations exhibited by these tables seem to exclude any gross local lesions (such as an ulcer) as being the essential part of the cause.

The Mechanism of Proliferation.

The existence of internal secretions which regulate the growth and proliferation of the structures of the skin and the organs of reproduction, is fully established. By analogy, in view of the conservative methods of evolution, it is probable that the epithelium of the digestive system is under similar control. But recent experimental work has shown that chronic irritants are able to produce a type of epithelioma with such regularity that the relationship between irritation and proliferation must first be considered. The alternatives may be set out as follows:

(*a*) Does irritation cause proliferation merely by bringing an increased supply of blood to the part, the blood presumably increasing the food supply and thus acting as the direct agent in producing new growth? Or

(*b*) Is the proliferation a protest against the irritation, a part of the reaction entailed in the replacement of damaged cells?

For example, does hard manual work cause a thickened epithelium simply because it causes a more active circulation, or has the epithelium received some new stimulus which continues to act long after the increased blood supply has become normal? I think it is the common experience that the epithelium of the hands continues to grow for weeks after the work which caused it to proliferate, has ceased. Otherwise callosities would quickly disappear after removal of the pressure. From what is known of the influence and mode of action of the internal secretions, it exceedingly probable that all growth, whether epithelial or otherwise, is due to their influence. Any cells at certain phases, normal or abnormal, of their life cycle, may call some such secretion to their assistance and proliferation will be the regular result. I shall call this internal secretion "proliferin."

"Proliferin" is probably distinct from the secretions of the thyreoid, pituitary or adrenals, but it may act in conjunction with one or more of them. In the ascending scale of life the various cells and organs become more and more dependent upon each other. As I have said, the secretions of the ductless glands are all archaic and have apparently been adapted to new functions as evolution proceeds. A change in their character is not, therefore, likely to occur, while the special problem of cancer is its steady increase quite in our own day. This modern increase points rather to a lessened demand for some secretion which may thus be accumulating in the system, because it is still being produced at its former rate. But the symptoms produced by excess of adrenalin and its *confrères* are known and do not resemble malignant disease.

Melanosis.

It has long been known that pigment in animals is for the most part formed by the inter-action of an oxidizing ferment (tyrosinase) upon certain colourless chromogenic substances.

Miss Durham[4] has shown that if the skin of young animals or of embryos be ground up and extracted with water, the expressed juice, when incubated with solid tyrosin, will throw down a pigment, if a trace of ferrous sulphate be added to act as an activator, but not in the absence of the activator. The skin of albinos so treated gives no results. More recently Onslow[5] has confirmed the results as regards the presence of the two factors, but doubts if the oxidizing agent is always tyrosinase.

Hence an albino is an individual whose skin lacks the power to secrete either the ferment or the activator. In true albinos there is no pigment in the skin, hair, eye, brain or sympathetic nerves. The developmental defect is accompanied by wide-reaching effects. Thus there are definite muscular movements, such as nystagmus in man, swaying of the head in Angora rabbits and the waltzing habit in Japanese mice. The character of the skin epithelium may be profoundly modified. Thus in Virginia the paint root plant is eaten by the pigs. It tints the bones of white pigs and causes their hoofs to fall off, but black pigs eat it with immunity.

The melanotic sarcomata connect cancers with albinism. They are comparatively common in white mares, but not in other horses. In man they affect the white and yellow races, but negroes are nearly exempt. The secondary growths all have the power of fixing the black pigment. As the cells of the tumour usurp the normal pigment function of the skin, the presumption is that a tyrosinase is present in these cells also. That is, in albino animals and light races of mankind a cancer may carry on in an

exaggerated form a function which is poorly developed in the tissues of the host. But when the normal cells (as in the negro and in coloured horses) are specially well endowed with this function, the pathological process does not occur. Melanotic sarcomata originate from a mole or other tissue in which the tyrosinase and the activator are concentrated and this mechanism for the fixation of pigment is transmitted by these cells to the secondary growths. It is clear from this example that some of the cells of a malignant tumour may exercise and transmit not only the function of proliferation, but also another and totally distinctive peculiarity of the cell. Incidentally, it will be noted that these sarcomata are hard cases to solve by any infective theory, not because they are pigmented, but because they occur in albinos who lack the normal function.

Parallel Action of the Sex Glands.

A second link in the chain is supplied by the changes in the mammary gland which follow conception. These are due to the action of an internal secretion of the ovary and include a deposit of pigment in the areola and proliferation of the secreting cells. Another internal secretion inhibits the full activity of these cells until the uterus has been emptied. Quite probably it is the same secretion of the ovary which causes the pigmentation and also the proliferation. If this be so, it appears that this secretion acts by provoking the one set of cells to secure a tyrosinase and the other to secure "proliferin." Further, as an activator is required for the tyrosinase, it is possible that it is required in the other case also.

I may now proceed a step farther. Whatever may be the nature of the force which regulates the growth of the body as a whole, it is certain that the sudden development at puberty is due to the secretions of the sex glands acting in cooperation with those of the thyreoid, adrenals and pituitary. As the result of conception the growth of the uterus and breast is accompanied by changes in ligaments, fibro-cartilages and bones. Hence these internal secretions bring about proliferation in all the tissues of which the body is composed—skin, including epithelium, hair, secreting glands and pigment, muscle, nerve, fat, ligament, cartilage and bone. It is not probable that there is a special stimulus for each type of tissue, but rather that each class of cells has by inheritance the power of fixing the one secretion by means of its own specific activator. That is, it is those cells which by inheritance "know" when, in the interests of the organism as a whole, it is necessary for them to proliferate, that alone are provided with the mechanism necessary to secure the stimulus.

Evidence that this is the case may be found in the results of grafting male organs into female animals and *vice versa*.

If the results of experiments on animals can be applied to man, the secondary sexual characters would undergo the change which corresponds to the transplanted organ. It would follow that in both sexes the breast is capable of fixing the stimulus from the ovary and similarly in both sexes the larynx is ready to respond to that of the testis. The most probable hypothesis to explain these facts is to suppose that the breast in both sexes secretes an activator appropriate for the secretion of the ovary and the larynx in both cases secretes an activator proper for the secretion of the testis. An activator is known to be necessary for normal pigmentation and if necessary for proliferation it affords an easy solution of most of the difficulties which beset any theory of tumours. If the ordinary carcinoma of the breast were a pigmented tumour, I think that its relationship to the normal physiological history of the organ would have been recognized long ago.

These observations on the cooperation of two factors in the mechanism of pigmentation first suggested to my mind the probability that two factors were also required in proliferation. The existence of the sensitizer (immune body or amboceptor) has been known for more than twenty years in regard to bacteriological and cytological work. In these instances it is called into existence during the process of immunization and is therefore specific for the foreign body against which the animal is defending itself. But why should the ovarian stimulus act so energetically on the cells of the breast and the skin near it and only occasionally act on the salivary glands and the skin near them? By analogy we should expect that some intercepting factor exists which is normally present in and near the breast, but very seldom in the glands of the face and the skin near them.[1] The mode of action seems to be as follows: The stimulus secreted, say, by the ovary, circulates all over the body, but it is intercepted only by certain cells, namely, those which have by inheritance the specific amboceptor or activator. As a result, the nuclei of these cells are stimulated to divide and the process of division continues as long as the necessary stimulus continues in action.

It is probable that the stimulus which causes the formation of tumours, is closely allied to the one which causes normal proliferation. For in the repair of a wound in cartilage, unstriped muscle and other tissues the new formation consists of fibrous tissue. But new growth of muscle takes place normally in the walls of the uterus and in hypertrophy of the bladder and other hollow viscera. New formation of muscle also occurs in tumours of the uterus, prostate, bladder, stomach and œsophagus. As this proliferation is not caused by injury, it would appear that in the case of injury the parts are left, so to speak, to their own devices. Whereas in tumour formation the process closely resembles normal physiological proliferation.

The Theory Applied to Warts.

The line of demarcation between chronic irritation, simple tumours and cancers may be studied in the different varieties of warts. Take first the crop that comes and disappears mysteriously on the hands of children and young adults. Contact with some fluid, such as saliva or milk, may start the growth and there is often evidence that cow's milk affects one member of a family but not the

[1] I refer, of course, to the exceptional deep pigmentation; not to the rings round the eyes.

others. The liability may run in families. The process is regarded as due to the penetration of the soft skin in early life by a mild irritant. The affected epithelial cells respond by secreting activator, which fixes the normal circulating "proliferin" and a simple tumour results. It does not form metastases and all the warts except one may disappear. That is, the survivor is the one in which the production of activator is most efficient.

The border line of malignancy is approached in cases of occupational warts. In those produced by dead tissues, soot, paraffin, etc., as the patient is older the quick response of youthful tissues no longer occurs and the irritant has more difficulty in penetrating the harder epidermis. Consequently, the epithelium requires to make a greater effort, that is, it cannot so easily produce sufficient activator to fix the necessary amount of "proliferin." Paget describes the old chimney sweep's cancer as being found in men and boys whose skin might be thick set with warts to the number of a hundred or more and scaly patches had often to be removed with the main growth. These conditions indicate that malignancy was not easily added to the characteristics of these tumours, owing perhaps to the fact that most of the sweeps were far from the condition of over-nutrition which predisposes to cancer. That in later life the wart more frequently forms a pre-cancerous condition is in my theory due to (*i.*) over-nutrition and (*ii.*) excess of "proliferin," for which the evidence will be adduced later on.

On the hypothesis that the irritant is the indirect cause of proliferation, the whole of these allied processes fall into line. In some cases the cell is easily provoked to form the activator and "proliferin" is easily secured; in others, the cells cannot rebel because one step or other in the process is more difficult to effect.

Implantation of the Activator.

Some ten years ago the work of Rous and others in America revived the infective theory of cancer. They showed that a certain sarcoma in chickens could be reproduced in nearly related chickens by inoculating the filtered extract of the fresh tumour tissue. The filter used was proof against *Bacillus fluorescens liquefaciens*, so that the particles inoculated were smaller than this bacillus and therefore much smaller than single cells or their nuclei. The cells proliferated only along the track of the needle and it was found that the addition of infusorial earth to the injection notably increased the percentage of successful growths.

At first sight these results seem to point to organisms of some kind as the cause of this particular sarcoma and Rous claims that his work with chickens has to a great extent demolished the theoretical basis on which the objections to an infective agent as the cause of cancer have been built up. He holds that the infective organism is either an ultramicroscopic bacterium or a stage in the life history of a plasmodium. But in spite of these very striking results the claim cannot be conceded that this is so until all alternative explanations have been worked out. In this case the juice of the sarcoma injected into a muscle produces a like sarcoma, which maintains the same character in all its metastases, while injection into epithelial tissues produces no effect. Let us assume that the germ-free filtrate contains a chemical substance derived from the cells of the sarcoma, which acts as a specific activator or co-enzyme to "proliferin." When injected into one of the mesoblastic tissues it fixes the circulating "proliferin" so that the connective tissue cells to which it has become attached begin to grow. The activator may determine the type of cell which will be produced by the proliferation, for its specific power compels the formation of cells similar to those from which it was produced and it will grow only in mesoblastic tissues.

Hence all the metastases have the same type as the parent growth. They continue to grow because they are supplied with "proliferin." They breed true because they secrete the same activator. Thus I assume that the agent which endows a normal cell with malignant characters is a biochemical one and that malignant cells continue to secrete this activator. The activator fixes the circulating "proliferin" perhaps in a similar way to that by which the sensitizing substance or amboceptor fixes the bactericidal substance or complement.

Returning now to the infective warts, it is possible that the infective agent is only the indirect cause of the eruption. It may cause the slow, continuous "irritation" which induces the cells to form activator, such as is seen in the case of methylene blue, aniline and bilharziosis in the epithelium of the bladder and coccidiosis in the case of the bile ducts of the rabbit. In yaws the inter-papillary pegs of the proliferating epithelium are striking features, but this spirochæte does not cause the leucocytosis which is seen in syphilis. So likewise condylomata are transferred by means of their seropurulent discharge; but while associated with the gonococcus it is not probable that this organism is the direct cause of the papillomata. So also in *verruga peruviana*, the highly vascular structure of both the small and large warts would lead one to regard the eruption as more akin to an infective tumour than to a granuloma caused by a micro-organism. The disease can be reproduced by cutaneous or subcutaneous inoculation, but apparently the effect of filtering the juice has not been tried. In more than one local variety of Oriental sore the histological characters strongly suggest an epithelioma. In all such chronic cases the question may be asked: "Are the tissues attempting to eject an invader as an enemy or forming activator in response to a friendly stimulus?" In the case of radiant energy there is no question of invasion and the various types of cell differ in their resistance to its action. Malignant proliferation, or, in other words, the formation of a specific activator, follows on what is for the given cell the necessary degree of "irritation."

Implantation of the activator may also explain the preference which is shown by some sarcomata for certain bones in which the secondary growths are formed, such as the series, wrist, humerus and scapula. If, as in other cases, these tumours are spread by loose cells floating in the blood stream,

the secondary growths would probably occur most frequently in the lungs. It is difficult to see why these cells should adopt the habit of wandering in the blood until they become arrested in the medulla of a bone. But if the activator is a specific sensitizing agent which may diffuse into the blood, it is reasonable to suppose that the cells most likely to respond to its influence will be bone cells resembling those from which it has come. So also in regard to the occurrence of similar growths in both ovaries, whatever may be the degree of malignancy. Here the activator from the original growth may find its way into the peritoneal fluid, as is known to be the case in serological work. From the peritoneum it may enter the healthy ovary through the scar of a recent Graafian vesicle or it may be a case of wandering in the blood stream seeking kindred tissue. The perplexing results reported in the attempts to grow cells *in vitro* may often be interpreted as indicating (*i.*) that both "proliferin" and activator must be present in the test tube and (*ii.*) that the activator is specific at least for epithelium.

Tumours of the Prostate.

I venture to think that some such hypothesis is the only one which will explain the complex conditions met with in the prostate. Here simple hypertrophy, fibroid change, inflammatory reactions, myoma, adenoma and carcinoma are all mixed. If each type of tumour had a separate cause, it must be supposed that the prostate forms a common meeting ground for many of them, whereas if all proliferation is attributed to a single secretion, it is necessary only to postulate that each type of tissue produces its own activator under chronic irritation. This irritant is found in the great majority of the cases to be an abnormal albuminous substance produced in the gland itself or perhaps in the bladder or kidneys.

Immunity to Cancer.

On this theory the natural process is for cancer to proceed to a fatal issue. The cells at first are the normal cells of the body, which change in character, becoming "embryonic," only as the growth becomes older and larger. They are not treated as invaders and therefore there is little leucocytic reaction unless bacteria effect a lodgement and lardaceous changes seldom occur. Hence also no antitoxin is formed and no animal can be rendered immune to its autologous growth. But in the case of homologous growths, young animals are more easily infected by growths than old ones, because there is normally a more abundant supply of "proliferin" in growing animals. Embryonic skin is the most efficient antigen to produce a transient immunity against epithelioma, because this skin contains the activator for the normal growth of skin, just the same as it contains the mechanism for the fixation of pigment. The injection of an abnormal amount of activator would therefore provoke the secretion of antibodies against the sudden disturbance of the balance in the tissues of the animal; but immunization cannot be carried to any high degree of resistance and a large injection of tumour cells is always able to overcome it. That is, the cells are not treated as invaders in the same sense as are the cells of an animal of a different species.

Irradiation of the spleen or removal of that organ prevents the development of even partial immunity. Here, as the spleen is known to be largely concerned in the production of antibodies of all kinds, it would be expected that its removal or injury would have the same influence in regard to the production of partial immunity against cancer as it has in regard to the production of full immunity against bacterial products. Hence also secondary growths are almost unknown in the spleen.

The fact that the negro is nearly immune against melanotic sarcoma is an example of autologous immunity, all the more interesting because he is very subject to other sarcomata. As the production and consumption of pigment is at a maximum, this mechanism is in good working order. No rebellion in regard to the pigment function of the cells is therefore allowed. But in white horses the pigment mechanism is faulty and I presume that when a sarcoma occurs, it is apt to annex any focus which is already abnormal in structure and function.

This theory also explains several otherwise puzzling facts. Tumours breed true because they produce their own type of activator and this can act only in conjunction with its own type of cell. The cells of the tumour produce activator but not "proliferin." On the other hand, the organs or tissues which produce "proliferin," finding that the normal supply is being exhausted, respond by increased production. Hence malignancy increases with lapse of time. Cancers tend to run a slow course in very old people and the younger the adult host, the more malignant the disease. Hence also pregnancy accelerates the course of carcinoma of the breast. We may also explain why recurrent fibroid sarcomata become more malignant with each successive local recurrence. The mechanism for producing activator is more efficient and the tissues have become accustomed to produce increased amounts of "proliferin." The whole process thus falls in line with the bacteriological facts ascertained in connexion with the production of antitoxin. Why are malignant growths almost invariably single and not multiple? Just as one shoot of a potato usually absorbs all the stimulus that causes growth and all the other buds fail to emerge, so the first focus of malignant growth forms its own mechanism for the production of activator and thus absorbs all available "proliferin." Probably also the control of all growth and proliferation is very tight, so that cancer would develope in few people were it not that the circulating supply of "proliferin" is abnormally large. If a man is completely relieved of, say, an epithelioma of the lip, he is not likely to get a second invasion of cancer elsewhere, because very few people have more than one group of cells in a rebellious mood and he passes beyond the danger age in peace. So also an ovarian graft refuses to grow if any trace of either ovary is left *in situ*, because the latter at once forms activator and secures the "proliferin."

Lastly, the sudden improvement in the general condition of the patient which so often follows complete removal of a cancer, may be due to the abnor-

mal amount of "proliferin" which, on this theory, would be at once made available for all the organs and tissues. The former cachexia was perhaps due in great part to the presence of half worn-out tissues, which were being starved by the tumour of their share of "proliferin." As soon as they are able to secure a new supply, they begin to rejuvenate, for I have already cited some evidence which tends to show that a tumour is not far removed from the normal physiological process. The so-called return to the embryonic condition may also be due to the excessive formation of activator by the cells of the tumour and of "proliferin" by the tissues of the host. In some cancers the amount of glycogen is far greater than that ever found in the adult liver and is equalled only by that present in the tissues of the early embryo, so that in this respect also the tumour exhibits a perversion of the normal physiological processes rather than the reaction against an invader.

Weak Links in Cell Control.

Very little is known of the mechanism by which the growth, division and differentiation of cells is made subordinate to the needs of the organism as a whole. I can only say that by inheritance most cells do submit quietly to the control of their fellows, but there is ample evidence to show that this control is not absolute. Instead of Cohnheim's "embryonic rests" I would say that here and there throughout the body a cell is "ready" to secure illicit supplies of "proliferin" if it can do so. These cells are more likely to be found at places where there is a change in the character, say, of the epithelium or where an archaic structure, such as Meckel's cartilage, has been adapted to new uses. So also are they more probably present in the most recent products of evolution, the mammalian skin, uterus and breast. Hence tumours of all kinds in children and young adults are to be regarded as due to developmental defects in some part of the central control of certain organs and tissues. At puberty these defects come to the front on account of the new stimulus which is reacting on all parts of the body. In young adults a bruise or other slight injury may be necessary to bring out the defect, because most of the cells which were ready to rebel spontaneously, have declared themselves by the time the growth of the body is nearly complete.

A definite increase in the cancer rate is seen soon after the age of forty and I shall next show how this may be accounted for. I assume that in the ancestral history of the body the average amount of "proliferin" required to meet the needs of daily life was gradually adjusted to the demand. As the wear and tear in all the epithelial surfaces varies from time to time, it came to pass that the supply was "pooled" and drawn upon as required. Sometimes the skin demands most, at other times the digestive system, while once a month the epithelium of the uterus requires a special supply. Heredity would be a factor in deciding the amount required and also in determining the existence of "rebellious" cells. Such heredity is not only seen in mice and rats,[6] but it is strikingly illustrated in the old Middlesex case, in which a mother and five of her daughters all developed cancer of the left breast. Even if such cases are too few to make a definite mark on the statisical record, their occurrence makes it easier to connect the causation of cancer with the evolutionary history of man.

Evidence from the Digestive System.

The fact that this system is the most frequent site of cancer in nearly all parts of the world makes it possible that modern civilization has dislocated the physiological balance between the nutrition of the epithelial cells and the work which they carry on.

(1) One of the most remarkable changes brought about by civilization is the modification of the foodstuffs. Wheat has practically displaced all other cereals amongst peoples of European descent; wheat is noted for the high percentage of digestible nutrients which it contains; all the modern improvements in milling methods have aimed at making a flour which is more completely digestible than that turned out by the older type of mill.

(2) Ease of digestibility has become a fetish with the public and not only wheat, but many other vegetables foods, are specially prepared to attain this end.

(3) The three countries—Norway, Japan and Holland—in which cancer of the stomach contributes the highest quota towards the total mortality from malignant disease, are noted for the extent to which fish enters into the general dietary of the people. Rice is the chief vegetable food of Japan.

(4) The part of the stomach usually affected (pyloric region) is that in which the muscular action of the organ is most marked during digestion.

(5) Elimination of indigestible residues by the preparation of the food has reduced to a considerable extent the amount of material which remains to be dealt with by the large intestine.

If there is any truth in my theory that cancer is related to reduction of work in the three great systems in which it occurs, there is no difficulty in showing that the digestive system does less work than formerly, certainly in regard to muscular exertion and probably also in regard to the secretion of the digestive fluids. All the available evidence points to the fact that in the eastern countries, Turkey, Syria, Arabia and Persia, cancer is exceedingly rare. These people use wheat largely, but they have been conservative in the type of mill; the meal is ground relatively fine, but it is never sifted. Countries, such as parts of India, where cancer of the stomach is almost unknown, make use of millet and legumens ground into a rather coarse meal. This probably leaves a large indigestible residue compared with wheat or rice.

It is hardly possible to prove that the regeneration of the gastric and intestinal glands is under the control of a chemical stimulus, but if the case can be proved for the organs of reproduction and for the skin, it is probable that this set of epithelium falls in line. In this connexion it is worth while recalling the fact that extensive lesions of the skin not infrequently lead to ulceration on one or other side of the pylorus.

Even if it could be proved that the digestive system is the part which has departed most from the

ancestral use of its epithelial cells and muscles, it by no means follows that cancers would develope in its tissues in like proportion. Under the system of "pooling" the surplus "proliferin" might find the cell most ready to proliferate in some other part of the body. Still, the very high percentage of cases of cancer which affect this system, would lead me to think that for the most part the stomach is the chief offender.

The Organs of Reproduction.

Two facts must be recognized in every theory of tumour formation: (*i.*) Their rapid increase in all sites in women coincides with the decline of the ovarian functions; (*ii.*) in association with this change the epithelium of the uterine glands no longer requires to be renewed every month. If my theory of the "pooling" of the surplus "proliferin" holds good, it is clear that the female organs will often suffer for the shortcomings of active cells in other parts of the body, because the incidence of adenomata of the breast and of uterine myomata shows that proliferation takes place in these organs with less "provocation" than in other parts of the body.

Investigation into the 25,000 deaths that occurred in England and Wales in the three years 1911-1913,(7) has thrown new light on the incidence of cancer of the ovary, breast and uterus. The number of deaths in this analysis is very much larger than those used for any earlier discussion and as far as English-speaking races are concerned, they give a very definite basis on which to work.

Taking all deaths from cancer at fifteen years and over, the incidence in single and married was as follows:

Relative Female Mortality from Cancer in England and Wales, 1911-1913.

Site.	Single.	Married.
Ovary	200	100
Breast	145	100
Uterus	100	173

Cancer of the ovary, very frequently sarcoma, occurs about twice as frequently in single women at all ages after thirty-five. This fact is of very great importance in any theory of cancer, even although the number of cases is small as compared with other sites. It seems to be almost decisive evidence against any infective theory. Cancer of the breast occurs nearly equally in single and married up to fifty, but after that age the cases are far more numerous in the single than in the married. Here, again, if due to an external infective agent, one would expect the undeveloped breast to be nearly immune. The excess of cancer of the uterus in the married occurs entirely before the age of fifty; after that age the cases become nearly equal in numbers.

The demonstration of the great preponderance of deaths from cancer of the breast in unmarried women came as a great surprise to medical men. It must be remembered, however, that in no other part of the world does the breast contribute such a large quota to the total mortality as amongst the allied racial group—England, Ireland, New Zealand, Australia, United States of America and Scotland, in the order named. Amongst Japanese women the breast is rarely affected, although cancer of the stomach is very common.

On any theory which sees in cancer a perversion of normal physiological functions, the fact that the cervix is so often selected may be explained by the analogy of the changes which take place in the earliest phases of pregnancy. These changes involve the increased activity of the glands and are the first response made by any part of the organ to the call periodically "expected" by the cells. The fact that the increase of cancer has been coincident with a steady fall in the birth-rate is often taken as *a priori* evidence that the two modern phenomena are connected causally. The increase of the rate of cancer of the breast from 150 to 188 in ten years is said to be related to the extent to which this organ has fallen into disease. If these English results could be applied directly to the problem of cancer in other parts of the world, they would furnish very strong support to my theory of the influence of disuse in the causation of the disease. But, taking the world as a whole, it appears that the most usual site of cancer in women is the stomach and the evidence is very evenly balanced as to whether the mortality is greater amongst the married or the single.

Clinical experience is said to show that cancer is most common amongst those who have married early, borne more than the average number of children and nursed them for longer than the usual period. It is true that such mothers may be sparsely built, but in the majority of cases they have exhibited in their reproductive functions a very high degree of efficiency. This very important point must therefore be left in abeyance for the present.

In England, as in most other countries, it is found that cancer occurs far more frequently in males in all the minor sites—lip, tongue, mouth, jaw, pharynx, œsophagus, pancreas, skin, larynx, lungs, pleura, kidneys, suprarenals, bladder and brain, as well as the indefinite group, "all other organs." On any theory involving the hypothesis of some cancer focus at the site of the disease, whether this focus is a group of abnormal cells or a centre of irritation, it is necessary to suppose that there is a great preponderance of such foci in males in all or nearly all the parts which are common to the two sexes.

On the other hand, if we suppose that the cause of the disease is a stimulus to proliferation circulating in the blood and acting upon normal cells which are ready to proliferate, there are physiological reasons why the female organs should so frequently have cells waiting this call. The preponderance of cancer in the unmarried after the age of fifty is presumably due to the existence of such cells which in married women have unfolded during pregnancy and lactation. The great increase in tumours at forty-five is due to the cessation of the monthly demand for "proliferin" and the release of the body from ovarian control.

It would appear that in the women of most races such groups of cells go far towards supplying all

the demands of this "cancer stimulus," whatever it may be, whereas in men the foci in the digestive system and skin are not numerous enough of themselves, but need to be supplemented by foci in all other parts of the body.

The Skin.

Reference has already been made to some of the facts which prove that the nutrition and proliferation of the skin and its appendages are under the control of internal secretions and the close sympathy between the skin and the digestive system is also well established. Evidence already brought forward shows that cancer as an occupational disease is influenced by the amount of muscular work involved in a given walk of life or presumably the average in an industrial centre. Climate and exposure to the wind appear to be factors and I have provisionally interpreted them by reference to the activity of the sweat glands.

Civilization has markedly reduced the work of the sweat glands:

(1) Savage man sweats excessively in all climates with few exceptions. In tropical Africa the nights are passed in smoky, unventilated huts, often to evade the mosquitoes. At the other extreme the Eskimo snow huts become insufferably hot in winter, so that the occupants go naked. Outside the hut the fur clothing is very warm, except when a blizzard is blowing.

(2) On the other hand, the action of the skin is lessened under conditions of civilization, partly by the adaptations of machinery, partly by the new conditions of labour, partly by the changes in the clothing of the body, both by day and by night. If the voluntary muscles and the sweat glands are the delinquents, the difficulty arises that neither of these structures is the site of cancer. Sarcoma of striped muscle is practically unknown and the same may almost be said of cancer beginning in the sweat glands. It was these facts which led me to conclude that the supply of "proliferin" must be "pooled," so that the cells most ready for rebellion take advantage of it. The cells of muscle and sweat glands are both archaic and therefore more likely to be under control. The striped muscular fibres are pre-vertebrate in their origin and the sweat glands have a suggestive resemblance to the secreting apparatus of the kidney. Hence, although the epithelial cells of these glands may make use of "proliferin," it is quite possible that any surplus may be seized upon by more "modern" structures—the sebaceous glands, hair follicles or the secreting cells which have been derived from those of the skin, particularly the mammary gland.

Another point which puts a different interpretation on the liability of the skin to cancer, is the fact that in some hospitals in England those cancers form one-sixth of all cases of malignant disease in the records. The results of early removal have quite altered the death-rate, but, of course, in order to round off my theory, it is necessary to explain why the sweat glands are not implicated if they are really the parts which are experiencing the results of disuse. Hence my theory of "pooling the 'proliferin.'"

Organs that Escape the Disease.

In contrast with the condition of the usual sites of cancer we may examine the case for the epithelium of the kidneys, urinary bladder and of the lungs. The fact that modern conditions have reduced the secretion of sweat makes it certain that the work done by the kidneys and their accessories is greater than was formerly the case. But the effect of chronic irritation on the epithelium of the bladder, as is seen in cases of bilharziosis, proves that these cells are ready to proliferate if they are provoked to do so.

In regard to the lungs, my analysis of occupational tendencies in regard to cancer showed that pulmonary tuberculosis and cancer are to a large extent mutually exclusive. The excretion from the bronchi undoubtedly wears out the epithelial cells, hence the lungs in pulmonary tuberculosis keep up a continuous demand for "proliferin." My theory, therefore, fits in well with the facts of the case in both these organs. The readiness with which secondary growths take place in the lungs, shows that there is no antagonism to cancer in the lungs similar to what is found to be the case in the spleen.

Conclusion.

In this theory I have tried to keep within the bounds of physiological facts; the existence of internal secretions, with functions similar to those required of "proliferin," is known. In the lower animals pigmentation requires the presence of an activator and work with bacteria, foreign cells and sera makes it highly probable that such activators are specific. The evidence for the recent increase of cancer seems to be conclusive. Hence the probability that recent changes brought about by civilization form a complex predisposing cause, the brunt of the perversion of the ancestral use of the cells falling in the three systems which form the chief sites of the disease. Other factors, such as mental worry, are not excluded, but evidence as to their action is more difficult to obtain.

If this explanation of cancer is the true one, prophylaxis is easy in theory, but perhaps difficult to put into practice. It is comprised chiefly in more muscular work at all ages after forty, less elaboration in the manufacture of cereal foods and the attainment of conditions which insure greater activity of the skin.

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Reports of Cases.

URETERIC CALCULI AND PHLEBOLITHS.

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W.B., aged thirty-nine years, a labourer, was admitted to hospital on June 23, 1921, complaining of pain in the right side.

The illness began fifteen months ago, with pain in the right side. The pain first appeared in the kidney region behind and radiated along the course of the ureter to the right groin. The onset was sudden; several severe and a number of milder attacks took place over a period of two months or more. The patient thinks that he passed a stone *per urethram*. The attacks then ceased completely until three months before admission. Again there was a sudden onset and the pain was still more severe. The pain had been of the same radiating character. The attacks occurred every few days and lasted about eight hours, with scalding on micturition and frequency. An X-ray examination about this time disclosed a shadow in the region of the lower end of the right ureter, with two small ones below it. In the skiagram it is seen that the shadow is very definite and round. About four days after this examination, the patient had another attack of renal colic, exactly similar to the previous attacks. Several days after this attack he was again examined by X-rays. In the skiagram there were the same shadows, apparently unaltered. A physical examination of the patient disclosed no abnormality beyond tenderness to pressure over the ureter.

On June 24, 1921, under local anæsthesia, a cystoscopic examination was carried out. An elongated calculus was observed protruding from the vesical orifice of the right ureter. It presented a striking appearance, as its white, crystalline facets reflected the light. An attempt was made to dislodge it from the grip of the ureteric orifice by means of the point of a ureteric catheter. This was too soft to dislodge it and no other appliance was available. It was anticipated that the patient would probably pass the stone naturally; this occurred two days later. It is mainly composed of phosphates. It is interesting to note that it was not seen in the skiagram. The second X-ray plate has since been inspected again. Over the lower portion of the sacrum there is a very faint shadow. This is absent in the later skiagram and it is no doubt due to the stone as it lay in the ureteric orifice. It is the difficulty that sometimes surrounds these cases that is the excuse for this brief report. Subsequent investigation, by placing the stone on the forearm and taking an X-ray picture, disclosed a very faint shadow. It now remained to determine the cause of the shadows on the skiagram.

On July 3, 1921, without any anæsthetic, an opaque catheter was passed up the right ureter and with the catheter *in situ* two X-ray pictures were taken in two planes at about 90° to one another. It was seen that the shadows of the catheter are not in relation to the other shadows in either picture. In other words, that whatever produces the round shadow is not in the lumen of the ureter and therefore is no a ureteric stone. The shadows are probably caused by phleboliths or calcified glands.

Reviews.

PULMONARY TUBERCULOSIS.

PULMONARY tuberculosis, its ætiology and treatment, by Dr. Muthu,[1] opens with an historical sketch of the disease from ancient times, which, though concise and interesting, supplies little fresh information. The prevalence of the disease, both during the past and present centuries, is assessed and considerable trouble is taken to prove how the different predisposing causes have intensified and affected its incidence and characteristics.

The book teems with scientific facts and is therefore valuable, but it is when drawing conclusions from this data that the author fails to convince. For instance, he states: "Life is one." "Mankind is one." "Micro-organisms are the product of environment." "Disease is inter-related in the defective or altered state of the blood; hence diseased conditions are within us and not outside." "Tuberculosis is only the expression of hunger for clean air, clean food, clean surroundings and clean mind."

In comparing these statements with the ordinary idea of tuberculosis, he attacks the moderate thinkers who consider tuberculosis not only a specific disease, but one largely due to predisposing causes.

The author devotes the greater portion of the book to an attempt to prove that the ætiology of tuberculosis depends very little on the presence of the bacilli, but on what most authorities call predisposing causes and that tubercle bacilli can be developed spontaneously in the tissues under favourable conditions. His description of pathological processes and laboratory experiments are numerous and valuable. He insists on the importance of malnutrition as an ætiological factor. Heredity and practically all other predisposing causes are carefully discussed. These causes must be overcome before tuberculosis can be properly prevented.

As regards treatment, he insists, as all do, on early diagnosis, but he throws no new light on this difficult problem. He is prejudiced in favour of sanatorium treatment as the only satisfactory one. He has nothing good to say about tuberculin or serum therapy. However, as regards treatment in the home, he supplies the general practitioner with reliable information and guidance which should be valuable.

In dealing with such a multiplicity of conflicting facts, it is at least refreshing and interesting to have them explained from a different point of view, even if we must join issue with the author in favour of the specific character of the tubercle bacilli.

However, the book is a protest against the general belief in the excessive infectiousness of tuberculosis, with its prevalent phthisiophobia and this, with the general information and style, should commend itself to the medical profession.

[1] "Pulmonary Tuberculosis: Its Etiology and Treatment," by David C. Muthu, M.D., F.R.C.S., L.R.C.P.; 1922. London: Baillière, Tindall & Cox; Demy 8vo., pp. 381, with 28 plates. Price: 12s. 6d..

Analytical Department.

PARKE, DAVIS & COMPANY.

AN account of the general arrangements and of the special methods of manufacture adopted by Parke, Davis & Company at their chemical factory at Rosebery, New South Wales, was published in THE MEDICAL JOURNAL OF AUSTRALIA of January 28, 1922. Appended to this account was a report on five preparations. We are now in a position to supplement this report by giving information concerning four further preparations manufactured by the firm. It is to be understood that, notwithstanding the adverse criticism of three of the four preparations, every care is taken by the firm in the pharmaceutical work and in the accuracy of the compounding. The general remarks contained in the former article apply equally in regard to the preparations dealt with below as to the first group.

Pepsin Cordial.

It is claimed by the manufacturers that "Pepsin Cordial" embraces all the elements essential to gastric digestion. It contains pepsin, rennin and aromatics and is rendered acid with lactic acid. Samples obtained at the factory and those purchased outside resembled one another closely in appearance, colour and taste. The preparation

is attractive and pleasant to take. The analysis revealed the following information:

Its specific gravity varied between 1.0388 and 1.048.	
Non-volatile substances ..	15.042% to 19.678%
Ash	0.4376% to 0.5172%
Alcohol	16.5% to 18%

It is claimed that one teaspoonful will digest four thousand grains of freshly coagulated egg albumin completely and that one teaspoonful will curdle two pints of fresh milk. Both these claims were confirmed. One cubic centimetre of "Pepsin Cordial" digested seventy grammes of freshly coagulated and disintegrated egg white completely in four hours. One cubic centimetre clotted three hundred cubic centimetres of milk in ten minutes. The junket formed had a pleasant taste, due to the presence of Tokay wine and other flavouring agents in the preparation.

No indication is given on the bottle of the date of manufacture. Neither is there any statement concerning the length of time the preparation will remain active if kept under ordinary conditions. A bottle corked with care and kept on a shelf in the laboratory, exposed to diffuse light, lost considerably in activity in the course of three months. It would therefore seem to be desirable that the date of manufacture should be stamped on the label.

The high percentage of the non-volatile substances was obtained from a sample taken from a settling vat at the factory. This sample was not as clear as the purchased sample. The preparation is kept in these vats until it is quite clear and is then standardized before it is bottled for sale.

"Pepsin Cordial" is a very attractive preparation. It is made with care and should be of value when it is desired to exhibit pepsin or for making junkets for invalids.

Liquor Sedans.

Each fluid ounce of "Liquor Sedans" is said to contain:

Black haw (*Viburnum prunifolium*), 60 grains.
Jamaica dogwood (*Piscidia*), 30 grains.
Hydrastine, representing 30 minims of the fluid extract of hydrastis.
Aromatics.

Samples obtained at the factory and those purchased in the open market were examined and were found to resemble each other in appearance, colour and taste. The analysis yielded the following:

Specific gravity	1.053 to 1.084
Non-volatile substances ..	41.4112% to 43.3284%
Alcohol	20.6% to 28%

None of the substances claimed to be present give sufficiently distinctive tests to warrant an exhaustive search for them, but the liquid has a distinct odour of valerianic acid, which is an important constituent of *Viburnum prunifolium*. It is a carefully compounded preparation and has a pleasant taste.

"Liquor Sedans" is a mixture of rather discredited drugs. Viburnum has been endowed with many virtues and is much vaunted as a uterine sedative. There is little evidence to justify a belief in the qualities claimed for it. It affects the higher cerebral centres and brings about a definite fall in blood pressure, sometimes with a good deal of discomfort to the patient.

Hydrastine, on the other hand, stimulates the vasomotor centre and constricts the arterioles, thus causing a rise in pressure with a subsequent fall. Hydrastine also causes weak uterine contractions. Cushny states that hydrastine has not attained any assured position in therapeutics, for at best it can only be considered an inferior substitute for ergot.

Piscidia is not official in any pharmacopœia excepting the Mexican. It is used as a fish poison in Jamaica. It has been claimed that it acts as a general sedative, but there is no evidence that it is of value in therapeutics.

A consideration of the pharmacological effects of the constituents of "Liquor Sedans" would indicate that it is a mixture which can have but little value for the purposes for which it is recommended.

Syrup Cocillana Compound.

"Syrup Cocillana Compound" is offered to the medical profession as a cough syrup and expectorant for use in inflammatory affections of the respiractory tract. It is said to contain seventeen substances, of which eleven are presumed to be active. These are *euphorbia, cocillana, Pinus canadensis, lactucarium*, squill, senega, tartar emetic, menthol, tolu, cascara and diacetyl-morphine (heroin). It is a most elegant pharmaceutical preparation, the general appearance, colour and particularly the taste being all that could be desired.

Analyses of samples collected at the factory and purchased elsewhere yielded the following information:

Specific gravity	1.2938 to 1.3012
Non-volatile substances ..	86.397% to 95.405%
Ash	0.018% to 0.0295%
Alcohol	3%

The presence of diacetyl-morphine and of antimony was demonstrated. The other constituents were not specially sought.

"Syrup Cocillana Compound" is a particularly bad example of the "shot-gun" mixture. As mentioned above, it contains seventeen ingredients. The only drug present in sufficient quantity to have any real therapeutic action is diacetyl-morphine.

Of the others, *cocillana* is not official in any pharmacopœia. It is supposed to resemble ipecacuanha in its action; very little is known about it.

Euphorbia also is not officinal in any country. It has been asserted that it is useful in the treatment of subacute and chronic inflammation of the respiratory tract, but no evidence of value has been offered to substantiate this claim.

Extractum pinus canadensis is noteworthy for its high tannin content. It would appear to have no more than an astringent action.

Lactucarium was formerly used as a sedative and soporific, but as it was found to be of little value, it soon went out of use.

The actions of the other substances present are well known. These ingredients, however, are present in very small amounts.

"Syrup Cocillana" is essentially a solution of diacetyl-morphine to which has been added small quantities of some drugs of known pharmacological action and a number of obsolete and discredited drugs. If it is required to prescribe diacetyl-morphine, it would be preferable to give it in simple mixture and not in a mixture of such complexity as "Syrup Cocillana Compound." There can be no justification for the exhibition of such a mixture.

Elixir Glycero-Phosphates.

Each fluid ounce of "Elixir Glycero-Phosphates Calcium and Sodium" is said to contain four grains of calcium glycero-phosphate and eight grains of sodium glycero-phosphate. This preparation may be regarded as a type of the group of the glycero-phosphate preparations.

Samples obtained at the factory and purchased in the open market resembled each other closely in appearance and taste. The taste is distinctly pleasant. The analysis of these samples yielded the following information:

Specific gravity	1.0809
Ash	2.074% to 2.3132%
Alcohol	15.5%
Inorganic phosphorus as P_2O_5	1.0765%
Organic phosphorus as P_2O_5	0.9803%
Calcium	0.208%

The preparation is very carefully compounded.

The use of glycero-phosphates is based on an obsolete and incorrect physiology. From the fact that nervous tissue contains phosphorus in organic combination it was assumed, without any experimental evidence, that glycero-phosphates would be useful as "nerve foods" or "nerve tonics." It has been demonstrated that glycero-phosphates are rapidly broken down in the body to phosphoric acid, which is excreted in the urine, and glycerine. They therefore have no more effect than would a mixture of inorganic phosphates, such as sodium phosphate, and glycerine. There is never any shortage of phosphates in an ordinary mixed diet. Consequently, the glycero-phosphates are entirely valueless from every point of view as therapeutic agents.

The Medical Journal of Australia

SATURDAY, APRIL 22, 1922.

The Journal and the Branches.

The relations of a medical journal to the medical profession are frequently misunderstood, especially when the journal in question is the so-called organ of a particular organization within the profession. Since The Medical Journal of Australia was established in 1914, circumstances have arisen from time to time which indicate that an erroneous conception exists in many quarters concerning the nature of the bond which links this journal to the Australian Branches of the British Medical Association and the responsibility for editorial utterances and expressions of opinion. The necessity of discussing this would not have arisen were it not for the fact that the Council of the Queensland Branch, interpreting the words "The Official Organ of the Branches of the British Medical Association in Australia" which used to appear on the cover of The Medical Journal of Australia, as vesting the Branches with some degree of proprietary rights, asked for a definite pronouncement on the subject. The same words have been misinterpreted in another connexion and have led to the assumption that the Branches share the responsibility for statements appearing in these columns. It will have been noted that the cover no longer bears the legend. This change has been effected, not because of any change in the relations between The Medical Journal of Australia and the Australian Branches of the British Medical Association, but merely to remove a misconception.

As every member of the six Branches of the British Medical Association situated in the Commonwealth is aware, the Australasian Medical Publishing Company, Limited, was formed in 1913 for the purpose of publishing one medical journal to serve the whole of Australia. The company was formed because the Branches collectively could not constitutionally own a medical journal or any other property. The British Medical Association, according to its Memorandum of Association, can carry out its objects, "by the publication of such information as may be thought desirable in the form of a periodical journal, which shall be the journal of the Association." *The British Medical Journal* is controlled by the Council of the Association, but the Council imposes no restrictions on the manner in which scientific problems are handled by the editor and his staff. The Council of the Association and the editor stand in close relation, so that in matters of medical policy the journal may be the mouthpiece of the Association. Such an arrangement was obviously impossible in Australia. No journal could be controlled by six independent bodies. On the other hand there appeared to be no difficulty in devising machinery whereby one journal might be of value to each of the six Branches and to the medical profession as a whole. The Branches were therefore asked to appoint three members each to be the members of the Australasian Medical Publishing Company, Limited. It was left to the Councils of the Branches to select men whose knowledge of the requirements of their respective Branches and of problems peculiar to their Branches rendered them suited for the position. The company thus comprises eighteen members; each Branch has equal representation. For the purpose of convenient management, one of each set of three members was appointed a Director, so that the Board of Directors comprises one from each of the six Australian Branches of the British Medical Association. This Board of Directors has control over The Medical Journal of Australia. Through it the requirements of the several Branches are brought to the notice of the Editor. The Directors meet at infrequent intervals, so that it is not possible to establish the same liaison between the representatives of the Branches and the Editor as exists between the Council of the Association and the editor of *The British Medical Journal*. The Directors have consequently given a general instruction to the Editor to the effect that the policy of the journal should coincide as far as is possible with the policy of the Federal Committee and of the several Branches in regard to medico-political matters. A local committee in Sydney is empowered to carry

out the wishes of the Board of Directors and to conduct the business of the Company in the intervals between the meetings of the Board.

Shortly after The Medical Journal of Australia was established, it was found that insuperable difficulties would be encountered by the Editor and his staff in the endeavour to carry out the instructions of the Directors unless machinery were created to bind the six Branch Councils more closely to the journal. This machinery included the appointment of a representative of the journal in each capital city except Sydney, whose duty it would be to advise the Editor of all steps taken by the Branch Council and the Branch in regard to matters of policy. The Councils individually recognized the necessity of a close cooperation and by imposing confidence in the Editor or his representative, enabled the former to follow their activities and to have records of resolutions embodying declarations of policy. The views of the six Councils do not always coincide; at times one Branch may have considered a particular question and may have adopted a definite policy in regard to it, while opinions may have been conflicting in other Branches or the matter may have escaped discussion. It will thus be seen that the Directors' general instruction is of necessity limited under certain circumstances and in certain directions. As long as the Branches comprise members with strong views on questions of expediency and policy, the best safeguard to insure assistance from The Medical Journal of Australia will be the establishment of the most confidential relations between the Branch Councils and the Editor.

The foregoing has exclusive reference to matters of medico-political and medico-ethical interest. It is necessary to remember that the primary object of the British Medical Association is the promotion of medical and the allied sciences. The Medical Journal of Australia is a means of disseminating medical and analogous knowledge among the members of the medical profession in the Commonwealth. Scientific matters have to be discussed in its columns and an endeavour has to be made to mould medical opinion. The responsibility of weighing scientific evidence on subjects extending over the whole realm of medicine and the allied sciences is very grave and is not lightly undertaken. No one man can be sufficiently expert in every branch of medicine to be a reliable judge. On the other hand, this responsibility cannot be divided. The Directors have recognized that it would lead to confusion and chaos were they to assume even partial responsibility in this regard and consequently they refrain from issuing any directions to the Editor on the manner in which scientific subjects should be dealt with in The Medical Journal of Australia. In these circumstances the Editor exercises his discretion in seeking advice and assistance before an editorial article is sanctioned for publication. The utterances as to both facts and opinions on scientific matters do not represent the views of the Australian Branches of the British Medical Association or of the Association as a whole. They are not necessarily shared by the teachers in the medical schools of our universities nor by those holding prominent positions on the staffs of the large metropolitan hospitals. All means are utilized to render the views expressed as authoritative as possible. Current and recent scientific literature is continuously studied, the opinions of experts in the various branches are sought and careful consideration is given to the views held in different parts of the world. Strict anonymity is preserved. Every editorial article, every review, every critical annotation is considered and re-considered before publication and the final responsibility is accepted by the Editor.

ASTHMA AND HAY FEVER.

The association between asthma and the exposure to the pollen of certain grasses, to the scent of certain flowers and to the proximity of certain domestic animals has been recognized for a very long time. Toward the end of last century it was generally held that grass pollen caused an acute swelling of the conjunctival and nasal mucosa as a result of mechanical irritation. Dunbar, of Hamburg, first pointed out that hay asthma and hay fever arose specifically as a result of the absorption of a chemical constituent of the noxious pollen. It was further recognized that the specific or non-specific irritant concerned in the determination of the onset of an attack of this condition was not the sole ætiological factor. Nervous influences were found to play a part and to be capable of being inherited. Early in the present century some clinicians claimed complete success in dealing with recurrent hay fever by applying nasal filters made of cotton wool and other material. Dunbar en-

deavoured to immunize his patients against the proteins of pollen and also claimed considerable success. More recently an endeavour has been made to identify these two processes with the anaphylactic state and to ascribe the hypersensibility to a variety of proteins. Hay fever was described as a state of allergy to proteins derived from foods, grass pollen, animal tissues, especially hair and skin, and the like. Chandler Walker undertook a very valuable and extensive study of the hypersensibility of the patients to the proteins referred to above. In the course of a large number of communications he elaborated a method of determining the agent concerned in the production of this hypersensibility. He isolated the proteins in a simple manner and by applying them to a scarified surface, grouped the types of hay fever and asthma according to the reactions. He recognized that not every asthma patient reacted to the proteins applied to the broken skin. Out of 400 persons suffering from hay fever or asthma, 271 manifested a hypersensibility to proteins derived from animal hair, food-stuffs, pollen or bacteria. He then applied the test of treatment and recorded that inhibition of the attacks and apparent cure followed treatment with the implicated protein in approximately 80%.

Other workers have concentrated their attention solely on the problem of hypersensibility to a protein. They have ignored the nervous element; they have neglected to study the relations between the disease manifestations and disturbances of metabolism; they have not sought to elucidate the process in the light of an inherited or acquired irritability of tissues caused by a disturbed endocrine balance. It is therefore not surprising to learn that there is almost as great a variation in the reaction of patients as there is in the individual peculiarities of the affection. Dr. Francis M. Rackemann has endeavoured to investigate a large series of asthmatic affections on the lines of Walker's reactions.[1] The number of patients subjected to his scrutiny was 939. He differentiates horse asthma, dust asthma, food asthma, bacterial asthma, emphysema, eczema, urticaria, angio-neurotic œdema and some allied conditions. The proteins prepared by the Arlington Chemical Company from common foods, such as wheat, rye, oats, rice, corn, egg, milk, peas, beans, strawberries, meats of various kinds and so forth, from animal dust and from danders were employed by the cutaneous test in accordance with Chandler Walker's technique. In several instances there was a distinct reaction to more than one class of protein, while group reactions were common. He has found the test of value in confirming the ætiology of asthma of doubtful nature when the history is suggestive of the cause being a pollen or a dust. He admits, however, that reactions may only be accepted as evidence of the ætiology when this is consonant with the history of the appearance of the symptoms. In about one hundred patients reactions were obtained which were incompatible with the history. Moreover, he finds that the information gained by the tests was of real value in the treatment only thirteen times. Notwithstanding this confession of relative failure, he advocates the employment of the tests, since it may lead to the alleviation of a small minority of persons with asthma.

Professor W. Storm van Leeuwen and Dr. H. Varekamp[1] found reason some time ago to associate certain forms of asthma with a disturbance of the metabolism of purins. They based their assumptions on the slowed excretion of excessive amounts of purins by asthmatics. They claimed to have obtained good results by keeping their patients on a purin-free diet and administering calcium chloride. Often, however, the results were not satisfactory. They then proceeded to test the patients for hypersensibility to a series of proteins according to Chandler Walker. Only four of eighteen patients yielded reactions. In view of this not encouraging result, they sought to discover some method of specific or non-specific protein therapy which would yield good results in a larger proportion than was obtained with treatment with Walker's proteins. They noted that normal persons often reacted strongly to von Pirquet's tuberculin test after the intra-cutaneous injection of dilute animal serum. This suggested to them that there might be some relationship between the reaction to the von Pirquet test and the intensity of the allergic reaction. Several observations appeared to confirm them in this view. They therefore applied the von Pirquet test to asthmatics. It may be mentioned that at a later date they became aware that Pietroforte had advocated in 1920 tuberculin treatment of asthma. The test was applied to thirty-four patients and a reaction was obtained in all but four. It is not suggested that the response was a definite manifestation of a tuberculous infection. In no instance were physical signs of an active tuberculous process discovered, nor were bacilli detected in the sputum. They treated their patients with tuberculin, employing minute doses with avoidance of a thermic reaction. In every patient the attacks of asthma were inhibited during the treatment by injections of adrenalin. In addition, the patients were kept on a purin-free diet and treated with inhalations of benzyl benzoate. A few previous attempts to control the attacks by means of Walker's specific proteins had failed to relieve. The authors claim to have effected a complete cure in eighteen out of twenty-eight patients, to have arrested the asthma attacks completely or almost completely, although a chronic bronchitis persisted, in a further four patients and to have improved five others. In one instance only did the tuberculin fail. They state that they supposed that a state of hypersensibility to tuberculin might be a factor which raises the susceptibility of patients to allergic or anaphylactic reactions. The argument is limited and unconvincing. They promise further evidence in support of their contentions. It is possible that the treatment of asthma and hay fever by means of minute quantities of tuberculin may be efficacious. But before this treatment can be accepted, the problem will have to be tested from the various points of view. In affections like asthma, suggestion may play an unsuspected part in the temporary cure of even 100% of patients of a small group.

[1] *The American Journal of the Medical Sciences*, January, 1912.

[1] *The Lancet*, December 31, 1921.

Abstracts from Current Medical Literature.

DERMATOLOGY.

Cutaneous Manifestations of Lymphatic Leuchæmia.

J. Butler (*Archives of Dermatology and Syphilis*, November, 1921) states that in lymphatic leuchæmia lymphadenotic infiltrations are found in the skin which are a part of the general disease. These infiltrations consist of hypoplastic lymphocytic elements and are supposed to be marrow lymphocytes transported by the blood stream and deposited in the skin and subcutaneous tissue. These lymphadenotic skin changes occurring in or preceding a lymphatic leuchæmia are of two forms: the circumscribed or tumour form and the diffuse or universal. Sometimes generalized skin affections, such as prurigo, purpura, urticaria, pruritus and generalized exfoliative dermatitis, are found associated with a leuchæmic condition. The differentiation of this group of affections from like processes in no way related to leuchæmia is impossible by clinical and histological means alone. Every patient manifesting such chronic lesions in the absence of a definite ætiological factor should have a blood examination at different times to determine the possible existence of a leuchæmia. The lymphadenotic skin changes are in no way dependent on the blood changes and they may be the first and only recognizable symptom of a leuchæmia. In considering skin affections that may be of a leuchæmic nature, it is important to bear in mind that the blood picture may have no relation to the aspect or cytology of the cutaneous lesion. The evolution of the skin lesions generally follows the evolution of the leuchæmia. They may occur at any time, sometimes at the beginning, sometimes during the course or in the final stage. They may occur before or after lymphatic, glandular or splenic involvement. They precede the blood changes in many cases. In these circumstances it may appear as if the cutaneous foci are the starting points of the disease. If visceral hypertrophy exists, it may escape notice; the cutaneous affection may be the first to appear and may appear to be independent of visceral changes. The visceral involvement may not be discovered until the body is examined after death. At times the cutaneous manifestations in leuchæmia are neglected and are considered as trivial incidents or they may dominate and mask the general malady. A historical examination in the circumscribed form reveals a dense and compact infiltrate comprising cells that have the morphological qualities of small or large lymphocytes. Accumulations of these lymphocytes occur around the vessels, especially where the blood supply is abundant, as around the follicles and glands. These lymphatic foci coalesce and form infiltrative masses. There is very little production of connective tissue around these lymphadenotic formations. The process spreads about the vessels to the reticular dermis and the subcutaneous tissue. The histology of the diffuse lymphadenosis of the skin discloses similar alterations but it differs in that the process is diffuse and involves the whole cutaneous integument. The original connective tissue is pushed aside and is replaced by lymphocytes and there is no proliferation of the connective tissue. There is a pronounced accumulation of polymorpho-nuclear cells, small lymphatic lymphoblasts and more rarely large and atypical forms. The papillary and sub-papillary layers contain dilated blood vessels and there is œdema with little or no infiltration. Numerous mitoses may be observed in this type, in contra-distinction to the circumscribed type.

Subacute Malignant Pemphigus with Extensive Bullæ.

John Lane and R. Lambert (*Archives of Dermatology and Syphilology*, August, 1921) state that Brocq, whose studies have done much to convert into comparative order the chaos which existed in regard to the study of the bullous dermatoses, has recently called attention to a group of cases of pemphigus not hitherto differentiated. Brock has given the name "subacute malignant pemphigus with extensive bullæ" to this condition, which he describes as closely resembling acute febrile pemphigus, but differentiated from it by a characteristic syndrome. Under the general name pemphigus Brock includes acute febrile pemphigus, *pemphigus foliaceus*, *pemphigus vegetans* and chronic or true pemphigus, the last of which is subdivided into chronic malignant pemphigus and chronic benign pemphigus. Acute febrile pemphigus is an apparently infectious disease characterized by a sudden onset and intense febrile reaction and an eruption consisting solely of serous or hæmorrhagic bullæ. It has usually a fatal termination within one to three weeks. Recovery is rare. It occurs almost entirely in butchers and those who handle cadavers and it is probably an acute infectious disease. Chronic pemphigus is insidious in onset. It is characterized by a wide-spread monomorphous, bullous eruption, which arises rapidly without evidence of inflammation in the skin and is attended with little or no pain or pruritus. It affects the whole body and bullæ appear in crops, the mucous membranes being affected early in the disease. There is a fatal termination within a time which varies from a few months to a year, but there are frequently intermissions with temporary improvement. Subacute malignant pemphigus is described as a syndrome presenting the general appearance of a severe infection without high temperature, but with marked prostration of the patient, who remains in bed without moving on account of the severe pain which occurs on the surface of the excoriations whenever motion is attempted. He speaks with difficulty on account of the lesions in the throat, soft palate and mucous membranes, which, though superficial, are extremely painful. In its evolution this syndrome is marked by its frequent origin on the mucous membranes and in its objective appearance it is characterized by the typical aspect of the cutaneous lesions. On the site of the broken bullæ, these lesions rapidly develope denuded, moist, sanguinolent surfaces, which show no tendency to heal and extend progressively at the edges, with detachment of the horny layer of the skin. This peripheral extension simulates a virulent impetigo, but there is no tendency to cicatrization in the centre of the lesion and the general condition of the patient is grave, in spite of only moderate fever. These facts constitute a fairly characteristic syndrome, which differentiates this condition from dermatitis and other bullous diseases. The prognosis is bad. In a case reported by the authors the clinical picture was typical. The eruption commenced as small vesicles which rapidly increased in size and number and became confluent until nearly the whole of the upper part of the chest and back was denuded.

Erythema Nodosum Syphiliticum.

Ernest L. McEwan (*Archives of Dermatology and Syphilology*, January, 1922) maintains that *erythema nodosum* should not be looked upon as a disease, but as a symptom and that its frequent association with syphilis demand that in the interests of consistency and clarity in dermatology the nomenclature should be re-adapted. *Erythema nodosum syphiliticum* occurs most frequently in women with fresh syphilis. It begins acutely, resembles simple *erythema nodosum* and resolves under anti-syphilitic treatment without breaking down. In a typical case he was able to show that the condition started with a phlebitis of a small subcutaneous vein. He regards *erythema multiforme syphiliticum* as an involvement of veins more superficially placed, namely, those of the cutaneous network.

Parapsoriasis.

Ernest Dwight Chipman (*Archives of Dermatology and Syphilology*, December, 1921) reports three examples of parapsoriasis corresponding to the types suggested by Brocq, *id est*, *parapsoriasis en gouttes*, *parapsoriasis lichenoides* and *parapsoriasis en plaques*. The three types are all similar histologically and do not respond readily to treatment. The history given by the patients afforded no clue as to the ætiology. Treatment here, however, was more satisfactory. In all three ultra-violet rays caused the disappearance of the lesions. Pluriglandular therapy was of undoubted service and notable improvement followed the administration of thyreoid gland extract.

RADIOLOGY.

Goitre Therapy.

R. G. Allison, A. H. Beard and G. A. McKinley (*American Journal of Roentgenology*, November, 1921) contribute a joint paper on the X-ray treatment of toxic goitre. The series consists of thirty-five cases treated over a period of twenty months. The patients were treated every week and a dose of thirty millampère-minutes was given through a four-millimetre aluminium and leather filter at a twenty-centimetre distance and with a twenty-centimetre spark gap. Three ports of entry were used, one on each side of the thyreoid gland and one over the thymus gland. If there was not marked improvement at the fourth sitting, the dosage was increased to thirty-four milliampère-minutes; with the increased dosage the patients invariably showed improvement. The majority showed improvement about two weeks after the first sitting. Tremor, nervousness, insomia and subjective cardiac symptoms are the first to disappear, while the tachycardia is late in passing away. The size of the gland is little affected by treatment and the exophthalmos had not completely disappeared in any of the cases reported. Patients show a tendency to tachycardia for many months after treatment, especially in times of mental stress. All patients had their basal metabolism estimated and showed gradual improvement during the course of treatment.

Radium in Cancer.

G. S. Willis (*Medical Record*, November 5, 1921) writes on the use of radium in cancer. Radium treatment is gradually recovering from the damage done by the original booming as a cure-all for cancer growths. Patients suffering from cancer are often kept until a hopeless condition is reached before reference for radiation. The author pleads for their earlier submission to radium therapy and considers that more such patients should receive pre-operative radiations. He points out that β rays can only penetrate about one centimetre of tissue, while γ rays cay penetrate up to ten centimetres. Care must be taken not to apply radium to patients whose blood shows less than 50% hæmoglobin value or less than three million red cells. Renal deficiency also contra-indicates treatment. The author administers sodium bicarbonate and sodium citrate after treatment, to prevent radiation sickness. Flat applicators and needles are combined in treatment, with brass and rubber screens of 1.5 and 1 millimetre thickness respectively. The needles contain 12.5 milligrammes and the applicators contain 25 to 60 milligrammes and are applied daily for an hour. The treatment extends over a month and is repeated if necessary. Where glandular areas are accessible, 600 milligramme-hour dosage is used over the glands. In rectal cancer, the author advises preliminary colostomy, as it greatly reduces the risk of complicating sepsis.

Radio-Ulnar Synostosis.

C. P. G. Wakely (*Archives of Radiology and Electrotherapy*, November, 1921) describes eight cases of congenital synostosis of the radius and ulna. No hereditary history was noted. The main characteristic is the fixity of one or both forearms in a position half way between pronation and supination, with free flexion at the elbow and wrist. There is firm, osseous union between the upper ends of the bones for from three to six centimetres. There is no union between the lower ends of the bones. The supinator muscles are defective and the *pronator radii teres* muscle and *pronator quadratus* muscle are much shortened.

Radium and Bone Tumours.

Isaac Levin (*Medical Record*, October 15, 1921) writes on the use of radium in the treatment of bone tumours. In bone tissue the reactions against injury are both regressive (osteoclastic) and progressive (osteoblastic). Osteoporosis is comparable to the destruction of all types of tissue in relation to active inflammatory lesions or tumours, while osteosclerosis and bone formation present an attempt to heal and overcome the pathological process. In metastatic carcinoma both processes may be noted side by side, but usually the osteosclerosis is imperfect and the bone is gradually destroyed. The writer has demonstrated that radium and Röntgen rays may enhance the healing powers and destroy the malignant tumour, surrounding it with new bone. Two cases are reported in detail and these showed rapid new bone formation under radium treatment. Multiple myelomata are considerably responsive to radiation. The author suggests the use of radium as a bone stimulant in cases of osteomyelitis after surgical removal of the necrotic bone.

The Retinometer.

Howard Pirie (*American Journal of Roentgenology*, February, 1921) describes a retinometer for determining the degree of sensitiveness of the retina for fluoroscopic work. It is a well-known fact that when a person has remained for a considerable time in darkness the retina is rendered much more sensitive for fluoroscopic examination and that a person coming from daylight into the X-ray room can scarcely distinguish shadows on the screen which are quite clear to a person who has been in the dark for some time. The retinometer consists of three luminous discs. The largest is triangular, the medium one oval and the smallest circular in shape, with a diameter of one millimetre. The material used is the ordinary luminous material of the "radium-faced" watch. The observer stands a metre from the instrument. The triangle first becomes visible, then the oval. The observer may now use the screen, but better results will be obtained if he waits until the small millimetre circle is visible.

Pneumo-Peritoneum.

Reuben Peterson (*Surgery, Gynecology and Obstetrics*, August, 1921) describes his methods and results in the radiographic examination of the pelvic organs after inflation of the peritoneal cavity with carbon dioxide gas. He finds pelvic Röntgenography one of the most interesting and helpful methods in the diagnosis of pelvic complaints and since his adoption of this method his percentage of diagnostic errors has been greatly reduced. In one hundred and fifty consecutive cases no accident was recorded after inflation of the abdomen, either through the anterior abdominal wall or through the uterus and tubes. The average amount of gas admitted was 500 c.cm. and patients rarely complained of discomfort until 1,000 c.cm. of gas were used. When adhesions were present, early discomfort was noted and if oxygen were used instead of carbon dioxide, the pain was at times considerable. Carbon dioxide absorbs very rapidly. In trans-uterine inflation a cannula is introduced into the uterus with the patient in the Sims position and a pressure of 200 mm. is employed. This route is contraindicated in acute or subacute pelvic inflammatory conditions. The uterus and tubes are shown in skiagrams and any irregularities and adhesions can be noted. The author also claims to be able to diagnose pregnancy in an early stage by this method.

Jejunal Ulcer.

E. S. Judd (*Surgery, Gynecology and Obstetrics*, August, 1921) writes on the occurrence of jejunal ulcer. Gastro-jejunostomy has proved a very successful operation for gastric and duodenal ulcers and the outlook for ultimate recovery is still further improved if the ulcer is excised at the time of operation. Unsatisfactory results from gastro-jejunostomy usually occur in cases in which the operation should never have been performed, that is, in cases where no ulcer was demonstrated. The formation of peptic ulcers some time after the operation is a serious complication and may occur at the line of the anastomosis or in the jejunum; such an ulcer is usually single and the ulcerated area is very small. Slow leaking of the ulcer leads to very extensive adhesions and œdema. In the Mayo Clinic the majority of these ulcers have been in the jejunum and they have been noted in 1.5% of persons subjected to gastro-enterostomy. Jejunal ulcer should be expected when a recurrence of symptoms follows an interval of relief after gastro-enterostomy. Radiography reveals a constant irregularity of the gastro-jejunostomy stoma, with narrowing of the jejunum distal to the stoma. Fistula into the colon is not uncommon and is due to a perforation of the ulcer into the colon.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne Hospital, on March 1, 1922, DR. J. GORDON, the President, in the chair.

Malignant Disease.

DR. T. CHERRY read a paper entitled "A Theory of Cancer" (see page 425).

DR. L. J. CLENDINNEN read a paper entitled "The Possibilities of Irradiation in Malignant Disease" and DR. W. J. PENFOLD read a paper on the causation of cancer.

Both these contributions and the discussion that ensued, will be published in THE MEDICAL JOURNAL OF AUSTRALIA of April 29, 1922.

NOTICES.

THE COUNCIL OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION has arranged the following provisional programme of the Branch. The Scientific Committee reserves to itself the right to modify the arrangements, but it is hoped that no changes will be necessary.

May 3, 1922.

At the Walter and Eliza Hall Institute, Melbourne Hospital, at 8.30 p.m..

DR. E. H. DERRICK: "Renal Tumours."

DR. JULIAN SMITH: "Diagnosis of Renal Tumours."

DR. H. ALAN S. NEWTON: "Treatment of Renal Tumours."

June 7, 1922.

At the Walter and Eliza Hall Institute, Melbourne Hospital, at 8.15 p.m..

DR. W. J. PENFOLD will demonstrate the action of pneumococci on aromatic amino bodies.

DR. W. J. PENFOLD: "Australian Pneumococci."

DR. S. W. PATTERSON: (*a*) "Prognosis in Pneumonia"; (*b*) "Clinical Application of Serum Treatment of Pneumonia."

DR. R. L. FORSYTH will open the discussion on the serum treatment of pneumonia from clinical experience at the Children's Hospital. Papers will be illustrated by lantern slides.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

CHAPMAN, WILLIAM JAMES, M.B., Ch.M., 1921 (Univ. Sydney), The Crescent, Homebush.

COOK, ERROL AUFRERE, M.B., Mast. Surg., 1921 (Univ. Sydney), Royal Alexandra Hospital for Children, Camperdown.

HALES, GEOFFREY MAURICE BARNEWALL, M.B., Mast. Surg., 1921 (Univ. Sydney), Royal Alexandra Hospital for Children, Camperdown.

HOLLAND, LLONDHA LLENOI, M.B., 1920, Mast. Surg., 1921 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

HULL, WALTER JOHN, M.B., Mast. Surg., 1921 (Univ. Sydney), 97, Audley Street, Petersham.

ICETON, SYDNEY GEORGE, M.B., Mast. Surg., 1920 (Univ. Sydney), Newcastle Hospital.

LOGAN, CEDRIC JAMES, M.B., Mast. Surg., 1921 (Univ. Sydney), Sydney Hospital.

WIPPELL, WALTER PLANTAGENET, M.B., Ch.M., 1921 (Univ. Sydney), Royal South Sydney Hospital, Zetland.

Medical Societies.

THE OPHTHALMOLOGICAL SOCIETY OF NEW SOUTH WALES.

A MEETING of the Ophthalmological Society of New South Wales was held in the Sydney Hospital on November 2, 1921, DR. J. J. KELLY, the President, in the chair.

DR. TEMPLE SMITH showed two patients and read the accounts of the illness of a third:

Nævus of Orbit.

The first patient was a child with an extensive cavernous nævus of the orbit, which he had previously brought under the notice of the Society. He had subjected the condition to six applications of electrolysis with a very good result. The greater part of the nævus was now consolidated and he thought that in one or two more applications it would be cured. Although in such immediate proximity to the cavernous sinus, there appeared to be no danger of thrombosis and it was to emphasize this that he had again shown the patient.

Plastic Repair of the Lower Lid.

The second patient was a returned soldier on whom he had done two plastic operations for the reconstruction of the lower lid, so that a glass eye could be worn. The particular point that he wished to emphasize was that he could see no advantage in burying the Thiersch-covered stent-mould as recommended by Gillies, of London, but thought that it was more advantageous to stitch the lower lid to the brow temporarily, thereby keeping the new area on the stretch and to use the stent merely as a convenient means of keeping the graft in position. Of course, this did not apply to the Esser inlay for deepening the socket, where burying was necessary.

Gumma of the Choriold.

Dr. Temple Smith also showed six progressive charts taken on Elliot's scotometer, showing the progress of a case of what appeared to him to be a gumma of the choriold. The patient, a lady of forty-seven, had complained of dim sight of the left eye. Vision was $^{5}/_{36}$, one letter. By the ophthalmoscope a raised, pale swelling was seen at or near the macula; it was slightly pigmented, but there was no detachment then or during twelve months of observation. There was a very large scotoma corresponding to the lesion. It was felt that it might have been a neoplasm, but full doses of iodide were given. Monthly observations were made and each month, though the intraocular appearance remained the same, the scotograph showed a progressively diminishing scotoma. This was now quite small and the vision had improved to $^{5}/_{12}$. The condition was considered to be cured. The remaining scotoma and impaired vision represented the area of scarred retina. It was only by such a method of charting that the progress of such a case could be estimated or appreciated.

The members present complimented Dr. Temple Smith on his demonstrations.

In the discussion, DR. H. G. ALLEN suggested that a complement-fixation test should be carried out and that the patient should be given salvarsan and mercury.

DR. E. A. D'OMBRAIN asked what preparation of iodide was used and whether any of the modern preparations had been used?

DR. KELLY thought that Dr. Temple Smith was correct in the diagnosis of a gumma.

DR. GUY ANTILL POCKLEY presented three patients:

Aniridia.

The first was a man, N.F., with aniridia and a partially dislocated lens lying with its axis horizontal. This man could read till twelve or thirteen years ago. He suddenly became worse one month ago.

In the discussion the members concurred with Dr. Guy Pockley in his opinion that it was unwise to do anything surgical.

Trachoma.

The second case was a man, P.D., aged twenty-six, suffering from bad trachoma and pannus. There was a mass on the anterior surface of the left iris. It appeared to be attached to the iris over an area extending from midway between the limbus and the lesser circle to the pupillary margin. It projected into the pupil and was yellow in colour, full of new vessels and appeared to be covered with a semi-transparent capsule. The pupil was normally active to light. The patient noticed its presence at least eight years ago; he thought that there had been no increase in size since then. Dr. Pockley regarded the condition as a slow-growing sarcoma.

In the discussion, DR. R. H. JONES and DR. J. J. KELLY thought that it was a cyst of the iris.

DR. F. J. BLAXLAND asked Dr. Pockley whether he thought that the condition was a dermoid cyst?

Vernal Catarrh.

The third patient was a girl with intractable spring catarrh; she had been shown at previous meetings. A tarsectomy had been done on the right eye without much success. Every form of treating, including solutions of fibrolysis, had been tried.

DR. ALLEN suggested the use of carbonic acid snow, as he had seen gratifying results following its use.

Fragment of Tin in the Vitreous.

DR. J. C. HALLIDAY read notes by DR. R. GRANVILLE WADDY of a foreign body in the vitreous. The patient was a bog, aged fourteen years. On September 7 the patient put a match to a nearly empty tin of carbide and in the subsequent explosion a chip of metal struck his right eye. He was seen on September 9, two days after the injury, when vision was $^6/_{24}$ in the injured eye. It showed very few signs of irritability and on careful examination a small horizontal wound was observed in the sclera adjoining the limbus at a point in the vertical diameter of the eye on the nasal side. There was no iritis and the pupil was vigorous.

A foreign body, apparently of tin or lead, was found suspended in the middle of the vitreous, in line with the discs as the patient looked directly ahead. The giant magnet was used in an attempt to extract, but the body proved to be non-magnetic.

No further interference was deemed advisable. The eye became quiet under atropine and argyrol without incident. At the time of the meeting the foreign body could be seen in the clear vitreous. It had gravitated slightly towards the interior portion of the globe. Dr. Waddy expressed the opinion that it would eventually come to rest on the retina. Vision remained impaired—$^6/_{24}$.

DR. GUY POCKLEY stated that he was disappointed in the use of the Mellinger magnet. He had found the Haab more efficacious.

DR. E. A. D'OMBRAIN asked whether vision would be impaired by removing the foreign body. It was thought wise to leave the foreign body *in situ*.

DR. H. G. ALLEN described a method whereby foreign bodies could be removed with a hand magnet without the loss of any vitreous. A purse-string suture was made round the site of the incision to insert the point of the hand magnet. After extraction an assistant pulled tight the suture and so prevented the escape of vitreous.

Malignant Disease of the Eye.

DR. H. G. ALLEN exhibited three patients with malignant diseases of the eye, with specimens and sections of the actual tumours.

He stated that the first case was one which from a medico-legal aspect was interesting. It showed to what extent the public could be harmed by quacks and persons practising as optometrists, oculists, ophthalmic opticians and such like. As long as the *Medical Act* remained unaltered, so long would the medical profession be exploited by such persons and the public made to suffer.

Mrs. T., aged fifty-four years, complained in February, 1918, of defective vision in the left eye of about two years' duration. The failure of vision had come on gradually, without any pain or redness of the eye. The vision in the eye had been good.

The pupillary reactions were normal; the tension was normal. The vision of the right eye was $^6/_6$; that of the left eye was hand movement at one metre. In the left fundus there was seen a small, raised area on the temporal side of the disc and in the macula region, which gave the impression of coming forward into the vitreous. The area was somewhat greyish in colour, with lighter areas and a few small spots of dark pigmentation at its summit. No new vessels could be detected and no actual hæmorrhagic spots were present. The right fundus was clear, save for some slight arterio-sclerosis. The patient's general health was good. There was no history of venereal disease.

A provisional diagnosis of probable early tumour of the chorioid of the left eye was made. The Wassermann test was carried out, but no reaction was obtained. The urine contained neither albumin nor sugar. Trans-illumination was of no avail, as the tumour was too far back.

The patient was advised as to her condition and large doses of potassium iodide and mercury were given. The condition of the fundus was watched for a few weeks.

In March the size of the tumour had not decreased. Enucleation of the left eye was advised. She was quite prepared to have the operation and arrangements were actually made and a date fixed. A few days before the date fixed Dr. Allen received a letter from the patient, stating that she had sought other advice and did not intend to undergo an operation. A few weeks later an announcement appeared in a local newspaper concerning an optometrist who had arrived in Newcastle.

In December, 1920, nearly two years later, the patient was brought to Dr. Allen with an acute attack of glaucoma in the same eye. She had beeen getting along fairly well for eighteen months, but had had one or two attacks of pain in the left eye, with slight redness, and the vision had not improved in any way. Her general health had not been good. She had lost weight. The left eye was deeply injected with a hazy cornea and a shallow anterior chamber; the tension was + 2. The pain had been very severe and accompanied by vomiting. Immediate enucleation was advised, as it was then quite clear that the increased tension was secondary to an intra-ocular tumour.

At the operation no involvement of the orbital tissues was found; the tumour was confined to the left globe.

The patient made a good recovery and was in fairly good health. No recurrence or secondary growths had made themselves manifest.

The pathologist's report on section of the tumour proved that it was a sarcoma with spindle cells predominant.

Dr. Allen said that this woman's life had been endangered by an unscrupulous individual who was not prevented by law from treating patients.

The second patient was a Mrs. H., aged sixty-eight years. She consulted Dr. Allen at Newcastle Hospital in May, 1920, for defective vision in the right eye, coming on gradually for some few months previously. There was no history of infection of the eye nor of pain.

The pupillary reactions were normal. The tension was normal. The vision of the right eye was $^6/_{36}$ and of the left eye $^6/_{60}$. Under a mydriatic, a large detachment of the retina could be seen in the right eye, apparently coming from the ciliary region and projecting forwards and inwards. It was somewhat cone-shaped and had several hæmorrhagic spots on its summit. It gave the impression of being solid. By oblique illumination it could be well seen through the dilated pupil. Trans-illumination revealed a solid structure. There was no reaction to the Wassermann test. Enucleation was advised.

The right eye was enucleated and portion of it was sent to Professor Welsh, who very kindly reported on the condition, stating that the growth was either sarcomatous or gliomatous, probably the latter. No evidence was found of any involvement of the orbital tissues. The patient made a good recovery and was kept under observation for about nine months.

Nearly twelve months from the time of her operation signs of gastric trouble appeared. She had been treated for this in May, 1921. She died of a large, inoperable malignant growth of the liver.

Unfortunately, no portion of the growth was removed

for examination. Dr. Allen surmised that the growth was secondary to the eye condition.

Dr. Allen's third patient was aged fifty-nine years. He was first seen in March, 1920, for a growth on his right eye of three months' duration. A raised, cauliflower-looking growth of the conjunctiva of his right eye was present, involving the nasal side of the bulbar conjunctiva and extending over the cornea for about half its circumference. It was freely movable over the cornea and did not appear to be attached to the cornea epithelium, but could be raised on the point of a probe. It was definitely attached to the conjunctiva near the limbus. It bled freely when manipulated. There was no history of injury. The patient's general health was good. A Wassermann test was carried out, but no reaction was obtained.

A small piece of the growth was removed and examined by Dr. Dick, who reported it to be an epithelioma.

The conjunctiva was freed on either side of the growth and a large angular-shaped area of conjunctiva was removed, together with the growth attached. The cut edges of conjunctiva were brought together by means of interrupted silk sutures. The wound healed without any trouble. No recurrence was noted in three months and there was no glandular involvement.

Optic Atrophy.

Dr. F. J. Blaxland presented a patient with optic atrophy following a fall from a horse. The patient was first seen on July 15, 1921. The vision of the left eye was barely $^{1}/_{60}$. The field was much contracted. The diagnosis of a probable fracture of the base of the skull was made. The patient remained in hospital in bed for twelve days. The vision of the right eye was $^{6}/_{6}$. Signs of optic atrophy were seen in the left disc, especially on the temporal side. Under treatment the vision had returned to practically normal. The field became larger and the disc assumed a more normal colour.

Small Foreign Bodies in the Orbit.

Dr. R. H. Jones showed a patient, aged twenty-two years. In 1917 his right eye and face were injured by a shell explosion. Small pieces of foreign bodies, chiefly of cement, were picked out. At this time the patient was in a very nervous state, as he had been repeatedly under heavy fire. The eye condition was treated for five months, but his vision was not as good as before the injury.

Just at this time he was going to an underground station in London with a soldier friend on a "moving staircase." On getting off they both remarked that they felt giddy. The friend died a few days after; he had a piece of shrapnel in his brain. The patient then developed a spasmodic condition of the right side of his face, including the eyelids. This was very severe for two months and then gradually got better. In twelve months from the outset the closed eyelids were all that remain of the condition. He had a great deal of treatment in England for this, but without benefit.

Dr. Jones saw him on May 26, 1921. The right eyelids were closed in a state of spasm, though they were not difficult to open. Pressure on the orbital edge at the outer part permitted the patient to open his eyelids about half the normal amount. The vision of the right eye enabled him to count fingers at 0.5 metre. There was about 1.2 dipoters of myopia. No lesions of the fundus was detected. There were some faint nebulæ on the cornea. The pupil acted normally. Some small foreign bodies were seen in the orbit under X-ray examination, but they were too small to localize.

Perforating Wound of the Eye.

Dr. Jones's second patient was a young man who had been struck in the right eye by a piece of glass twelve hours before. There was a perforating wound of the front of the eye, extending from just inside the sclera at a point close to the highest point to a point in the transverse diameter of the eye on the nasal side, where in involved the sclerotic for at least 1.25 centimetres. The eye looked hopelessly lost, but as there was no prolapse of ciliary body or vitreous, an attempt was made to save it. The conjunctiva was freed on the nasal side surrounding the wound and the edges of the wound were brought together by means of sutures. He made an uninterrupted recovery. Fortunately the lens was not wounded and he obtained a useful eye with improving vision.

Obituary.

PATRICK MANSON.

Patrick Manson is dead. One of the giants of modern tropical medicine, his renown is world-wide and his name a household word. To the present generation he is known as a pioneer, although to many of the elder members of the medical profession the recognition of his brilliant career is inseparably associated with the recollection of a fine old gentleman, a sterling friend and the personification of all that stands for honour and integrity.

Patrick Manson was born on October 3, 1844. He was a Scot and came of an old Scottish stock. He received his scholastic and medical education in his native city of Aberdeen. At the age of twenty-two years he graduated as a doctor of medicine and then he left the scene of his youth and started on his long travels, impelled by a force which did not leave him, even when advancing age and repeated attacks of gout kept him pinned to his home in London or County Galway. Before he had attained his twenty-seventh year he was busy at the distant treaty port of Amoy, in China, peering into the darkness which surrounded many of the wide-spread diseases of the tropical east. He had received no specialized training in the modern laboratory and was innocent of the ideas which were moulding the minds of the leaders of the scientific world in the early 'seventies. Despite the lack of experience and without guidance he conducted an inquiry into the causation of filariasis on lines of extraordinary accuracy and scientific merit. His first publication on this disease dates back to 1871. Others followed during the next thirteen years. In this literature he presented to the world of science the proof that the embryos of filaria are conveyed by mosquitoes from man to man. The importance of this work is now recognized to the full. It has significance not merely in regard to one disease. It has application to malaria and to many other tropical diseases. At first the importance of this wonderful work was not appreciated. Manson worked almost unnoticed in China and the European pathologists scarcely heeded the lessons he taught. Many years later Ronald Ross was able to demonstrate the truth of Manson's hypothesis that filariasis and other tropical diseases are dependent for their spread on the development of the parasite within the mosquito, by producing evidence of the life cycle of the plasmodium of malaria and its sojourn in the anopheline mosquito. Ross was guided by the early work of Manson and built on the firm structure laid down by him in his patient and epoch-making studies. After a lapse of years the Royal Society awakened to the fact that Manson's work was monumental and the honour of the Fellowship was bestowed on him. Still later, in 1903, His Majesty King Edward VII. was advised to bestow on him the knighthood of the Order of Saint Michael and Saint George and in 1912 King George created him a Knight of the Grand Cross of Saint Michael and Saint George. His *alma mater* recognized his ability, learning and genius and gave him the degree of doctor of letters in 1886. The degree of doctor of science was conferred on him subsequently by the University of Oxford; lastly, the Royal College of Physicians of London elected him a Fellow in recognition of his contributions to science.

His immense influence on the development of the science of tropical medicine was not restricted to his own observations. During the course of his long, active life, he studied countless problems and added innumerable data to knowledge. He stimulated others to work; his example and encouragement were so infective that scarcely any young practitioner with ability who came into contact with Manson, failed to join the growing army of workers in tropical medicine. At an early stage of his career he was Dean and Lecturer at the College of Medicine for the Chinese at Hong Kong. Later he was the "Grand Old Man" of the London School of Tropical Medicine. They chose him to be the Medical Adviser to the Colonial Office and in this capacity he exercised an immense and beneficent influence on the position taken by Great Britain in tropical medicine. He was Consulting Physician to the Seamen's Hospital Society and to the British Seamen's Hospital at

Greenwich during the years when he yearned to return to actual work in the tropical parts of the world. His Goulstonian Lectures, his Lane Lectures and his many lectures on tropical diseases, delivered though they were long years ago, may be read with great profit by the present generation of research workers. Mention should be made of the fact that he was created a foreign Associate of L'Académie de Médecine de France. Manson's work will remain a monument that will keep his name vividly before the scientists of the world for centuries to come.

ALFRED SUTTON.

"It is with great regret we have to announce the death of Dr. Alfred Sutton, C.B., C.M.G., V.D., formerly Principal Medical Officer of the First Military District. Dr. Sutton died on April 15, 1922, at his residence at Paddington, near Brisbane.

Correspondence.

THE PREVALENCE OF TUBERCULOSIS IN AUSTRALIA.

Sir: I was very pleased to read in your number of March 25 Dr. Hone's remarks *re* infection of tuberculosis in Australia.

The statistics of Naegele and others are frequently quoted and are, I am afraid, thoughtlessly copied from one textbook to another. Many clinical teachers also make use of the same figures, which have not been verified in the way they should have been. In Zurich and elsewhere it is confidently stated that over 90% of the population have been affected at some time of their lives. Sir James Fowler quotes about 9% as his experience, which has been extensive.

That "*Jedermann ist ein bischen tuberculös*" may be true in Europe (which I very much doubt). In Australia it is probably a myth. Certainly it has never been proved.

I cordially agree with Dr. Hone that the pathology and pathogenesis of pulmonary tuberculosis require to be investigated from an Australian point of view.

Yours, etc.,

A. Stewart.

123, Wickham Terrace, Brisbane,
March 30, 1922.

WARMED ETHER.

Sir: Dr. Corlette has ridden his high horse, fed on graphs and stabled in a calorimeter, long enough. He has made the great discovery that pumping air through ether dehydrates the air. Therefore, he insists that the delivery of warmed dried anæsthetic vapours is more harmful than otherwise to the patient, the dehydration being depressing and the warming a piece of anæsthetic embroidery. Being one of the Australian pioneers of warm ether, I have read his articles and tried to find the flaw in his reasoning, for there must be a flaw when clinical results are so contradictory to laboratory experiments. Were all anæsthetics delivered intra-tracheally, then the patient would lose an undue amount of moisture and it is probable that the dried air might have a locally irritating action on the trachea. But many of us deliver warmed ether vapour under a mask and as the patient inhales air through the mask the resulting mixture is no means dry. Later, with the patient's expired air and vapour adhering and moistening the mask, there is inhaled a mixture of air-ether and water vapour which would amply supply all wants.

Facts are stubborn things. The ordinary open-ether mask, soaked with ether, must deliver to the patient a cold ether vapour, which first is dehydrated as the air must pass through the ether. Later, with the moisture absorbed, it would deliver an icy cold mixture of air, ether and water vapour.

The stubbornest fact of all is that patients with warmed ether are better in colour, pulse and general condition at the end of a long operation than patients with open ether. Also, there are fewer respiratory troubles and less vomiting.

Intra-tracheal delivery is, in my opinion, the only indication to moisten the anæsthetic mixture.

Dr. Corlette refers to himself as an iconoclast. I am afraid that, like others of the class, he has cast down an idol of fire and installed in its place a god of water vapour.

Yours, etc., M. Kasner Moss.

"Melba Chambers," Hay Street, Perth,
March 28, 1922.

THE METRIC OR THE IMPERIAL SYSTEM.

Sir: As one in complete agreement with Dr. Mary C. de Garis's views concerning the metric system, I was glad to read her "reactionary letter." Until the Imperial system is abolished by law and the metric system taught in our schools and used in our every-day life, so that we think in it, there seems to me to be no advantage to medical men in adopting the system in their every-day work. I am not referring to laboratory workers. It is no doubt true that by a simple calculation I can change my thoughts in Imperial measure to metric measure; but why should I be put to that trouble, especially as the chemist, according to Dr. John MacPherson, has to change it back to the Imperial measure again.

It is also no doubt true that meetings of three Australian Branches of the British Medical Association have carried resolutions in favour of the adoption of the metric system, but personally I regard the vote of the New South Wales Branch as due to the enthusiasm of the few and the lethargy of the rest. In my position as police surgeon, I see every year hundreds of prescriptions from general practitioners and Macquarie Street consultants, but I rarely see one written in the metric system. Nor has the number of the latter increased since the resolution mentioned.

I wonder how many of the enthusiasts really think in the metric system when they estimate the height of a person, the imaginary length of a golf drive or the real quantity of a pint of beer. If they can convert the last into a litre, I might see advantages in the metric system.

Yours, etc., Arthur Palmer.

Sydney, April 8, 1922.

THE COST OF MEDICINES.

Sir: I was much surprised some time since to notice, through our chemists' professional journals, that Dr. Sydney Jamieson, of Macquarie Street, Sydney, had written a letter to The Medical Journal of Australia stating that he had informed a patient that the chemists were charging her too much for some article which he had ordered her in a prescription and that he had sent her to the Commonwealth Laboratories so that she might procure the article from there at a lower price.

I will only say here that Dr. Jamieson must have been well aware that he was taking this action in connexion with a matter which concerned his patient and the chemist alone and in which, as a professional man, he had no right to interfere.

Did Dr. Jamieson ever hear of a chemist telling a customer of his that it was a "glaring example of profiteering" for any doctor living in Macquarie Street to charge him one or two guineas or more for attending him with a sprained wrist, while, if he went to a doctor living in Newtown, he would look after it just as well for half a sovereign, or if he went to a Chinaman in Goulburn Street he would be as well treated for half-a-crown?

I contend that by his action in interfering between his patient and the chemist Dr. Jamieson has committed a flagrant breach of professional etiquette which he would very strongly resent if he ever heard of a chemist interfering between that patient and himself.

As I am informed that the space allowable in your journal for a letter of this kind is so limited that I cannot fully express myself in connexion with this matter—upon

which I feel very strongly and which much interests every pharmaceutical chemist in Australasia—I shall forward a letter upon the subject to *The Australasian Journal of Pharmacy* and ask for its insertion there. Yours, etc.,

E. McC. S. HILL,
PH.C., L.P.S.I., M.P.S. (N.S.W.),
L.M., R.D.S., F.S.G. (Lond.), etc.

Wingham, Manning River, April 11, 1922.

University Intelligence.

UNIVERSITY OF OTAGO.

WE learn that DR. CHARLES ERNEST HERCUS has been appointed Professor of Bacteriology at the Otago University, New Zealand. It will be remembered that the chair became vacant after the death of PROFESSOR S. T. CHAMPTALOUP on December 11, 1921.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered under the provisions of the *Medical Act, 1912 and 1915*, as duly qualified medical practitioners:

ANDERSON, NOËL ALEXANDER LEWIS, M.B., Bac. Surg., 1920 (Univ. Melb.), "Stoneholm," Moree Street, Gordon.

TIPPING, HENRY HUBERT, M.R.C.S. (Eng.), 1892; L.R.C.P. (Lond.), 1892, Bank of New Zealand, Sydney.

Additional Registration:

CAHALAN, DOMINIC AUGUSTINE, Ch.M., 1922 (Univ. Sydney).

COLLIER, FREDERICK WILLIAM DEAN, Ch.M., 1922 (Univ. Sydney).

COPPLESON, VICTOR MARCUS, F.R.C.S. (Eng.), 1921.

VICTORIA.

THE undermentioned have been registered under the provisions of Part I. of the *Medical Act, 1915*, as duly qualified medical practitioners:

BRODIE, ROBERT CHARLES ESPINASSE, M.B., B.S., 1921 (Univ. Melb.), c.o. J. Sanderson & Co., 111, William Street, Melbourne.

ORR, FREDERICK LAYTON, M.R.C.S. (Eng.), L.R.C.P. (Lond.), 1896, M.D. (Univ. Lond.), 1896, 63, Robinson's Road, Hawthorn.

Additional Diploma Registered:

CHAMBERS, ROY WILLIAM, M.D., 1921 (Univ. Melb.).

Medical Appointments.

THE COMMISSION OF PUBLIC HEALTH OF VICTORIA has appointed the undermentioned as places for public vaccination at stated hours: The surgery of DR. C. T. ABBOTT (B.M.A.) at Murtoa; the surgery and the rooms of DR. W. H. JAMES at Warburton and at Yarra Junction respectively; the surgery of DR. J. PARK (B.M.A.) at Tatura; the surgery of DR. T. E. ROCHE at Dromana.

* * * *

DR. J. BOGLE has been appointed Government Medical Officer at Port Douglas, Queensland, and a Health Officer for the purposes of *The Health Acts, 1900 to 1917*.

* * * *

DR. H. A. WYLLIE (B.M.A.) has been appointed an Honorary Commissioner to inquire into and report upon the Spahlinger treatment of tuberculous diseases in South Australia.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Manchester Unity Independent Order of Oddfellows Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Hampden District Hospital Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary. 3, North Terrace. Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, 6, Bank of New South Wales Chambers, St. George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

APR. 25.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
APR. 26.—Victorian Branch, B.M.A.: Council.
APR. 27.—South Australian Branch, B.M.A.: Branch.
APR. 27.—Brisbane Hospital for Sick Children: Clinical Meeting.
APR. 28.—New South Wales Branch, B.M.A.: Branch.
APR. 28.—Queensland Branch, B.M.A.: Council.
MAY 3.—Victorian Branch, B.M.A.: Branch.
MAY 5.—Queensland Branch, B.M.A.: Branch.
MAY 9.—New South Wales Branch, B.M.A.: Ethics Committee.
MAY 10.—Western Australian Branch, B.M.A.: Council.
MAY 10.—Melbourne Pædiatric Society.
MAY 11.—Victorian Branch, B.M.A.: Council.
MAY 11.—City Medical Association, New South Wales.
MAY 12.—New South Wales Branch, B.M.A.: Clinical Meeting.
MAY 12.—Queensland Branch, B.M.A.: Council.
MAY 12.—South Australian Branch, B.M.A.: Council.
MAY 15.—Illawarra Suburbs Medical Association, New South Wales.
MAY 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, B.M.A. Building, 30-34, Elizabeth Street, Sydney. (Telephone: B. 4635.)